Platelet Incubator Operation Manual

i.Series™

Countertop: PC100i, PC900i, PC1200i	Version A
Floor: PC2200i, PC3200i, PC4200i	Version A

Horizon Series™

Countertop: PC100h, PC900h, PC1200h	Version A
Floor: PC2200h, PC3200h, PC4200h	Version A

Model _____

S/N _____

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About this manual

Welcome to the Platelet Incubator Operation Manual. This section explains the symbols and conventions used in this manual, copyright information about this document, and trademark information for products supplied by Helmer.

Symbols and conventions

Several symbols and conventions are used in this manual.

Warnings

A Warning is used to call attention to a condition or possible situation that could cause injury to the operator.

Warnings are identified as follows:

WARNING:	This is a sample of a warning: The incubator has the potential of being a shock hazard. Review all safety instructions.

Cautions

A Caution is used to call attention to a condition or possible situation that could damage or destroy the equipment or the operator's work.

Cautions are identified as follows:

CAUTION:	This is a sample of a caution: Be sure that the storage frame is free of obstructions before starting agitation.

Notes

Notes contain additional information about a topic. Notes are used to provide information about how a topic relates to another topic, or background information about a design characteristic.

Notes are identified as follows:

NOTE:	This is a sample of a note: A remote alarm monitoring system is available for purchase through Helmer.

Model references

Generic references are used throughout this manual to group models that contain similar features. For example, "PC100" refers to both the i.Series (PC100i) and Horizon Series (PC100h) models; while "countertop" refers to the PC100, PC900, and PC1200 i.Series and Horizon models. If a feature or procedure applies to a specific model or a specific voltage, it is stated as such.

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1 Working safely

This section describes general safety information for installing, using, and maintaining the incubator. Your organization may provide additional safety information.

1.1 Understanding safety-related labels

The following safety-related labels may appear on your incubator.

Warning

Caution, hot surface

Protective earth ground terminal

CAUTION: Do not open more than one drawer at a time.

CAUTION: Do not open more than one drawer at a time

1.2 General safety

To avoid injury to yourself and the incubator, follow these safety instructions:

- Use the incubator for the purpose for which it was designed.
- Do not use the incubator if its components are damaged. Notify the appropriate personnel in your organization for guidance regarding usage and maintenance.
- Never attempt to physically restrict any of the moving components.
- Do not move or bump the incubator during operation.
- Before performing the procedures in this manual, review the specific safety instructions for them.
- Perform only the maintenance described in this manual. Maintenance other than that specified in this manual should only be performed by technical service representatives authorized by Helmer.
- When lifting a countertop incubator, hold it on the ends of the base and lift. If the incubator is too heavy or awkward for you to move alone, get assistance as needed.
- If you are attaching or using external devices with the incubator, follow the manufacturers' safety and operation instructions for them.

1.3 Electrical safety

WARNING: The incubator has the potential of being a shock hazard. Review all safety instructions.

Review the following safety instructions before installing, using, or maintaining the incubator:

- ► Inspect all electrical equipment and address any problems prior to installation.
- ► Avoid removing covers from the incubator unless instructed to do so.
- ► Use only the power cords supplied with the incubator.
- ► Avoid using multi-plug power strips. Connect directly to properly grounded wall outlets.

1.4 Chemical and biological safety

WARNING: In addition to the instructions included in this manual, follow all chemical handling and disposal requirements and procedures specified by your organization.

Chemical handling and disposal requirements for your organization may include the following:

- ► Use of appropriate protective equipment when cleaning the incubator
- ► Use of specific cleansers and cleaning supplies
- ► Appropriate handling and disposal of materials that are infectious, toxic, pathological, radioactive, or otherwise biologically or environmentally harmful.
- ► Notification of appropriate chemical and biological safety personnel when handling or disposing of materials that are infectious, toxic, pathological, radioactive, or otherwise biologically or environmentally harmful.

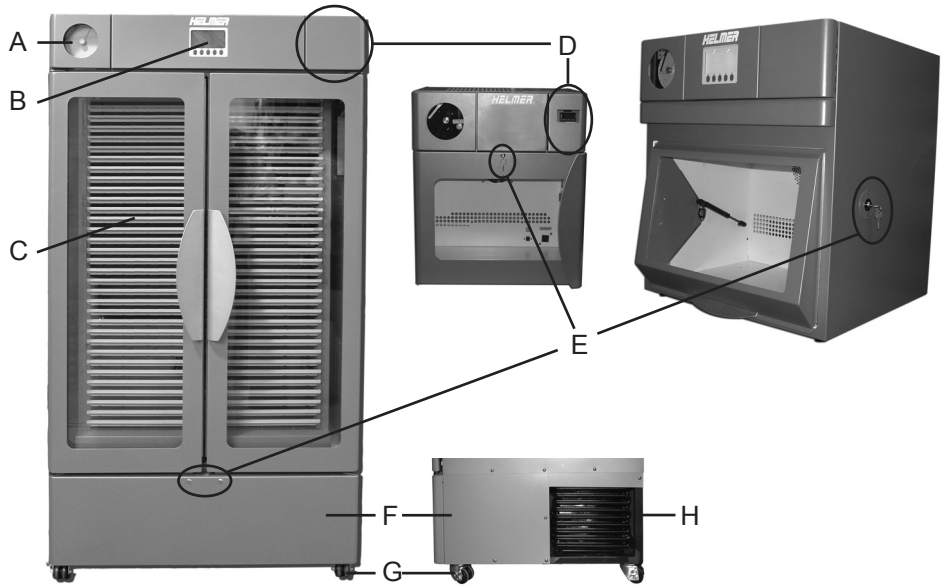
WARNING: Before sending parts to Helmer or your distributor for service or repair, decontaminate them as appropriate. Any items that have not been decontaminated appropriately will not be accepted. Documentation stating that the contents are not contaminated and are safe to handle must accompany all returns. Contact Helmer or your distributor for decontamination instructions and a return authorization number.

2 Touring the incubator

Congratulations on your purchase of a Helmer Platelet Incubator. The incubator provides precise temperature control and monitoring for your platelet storage needs.

This section gives a brief overview of the components of the incubator. Note that some components vary by model or options selected at the time of purchase. The location of components also varies by model.

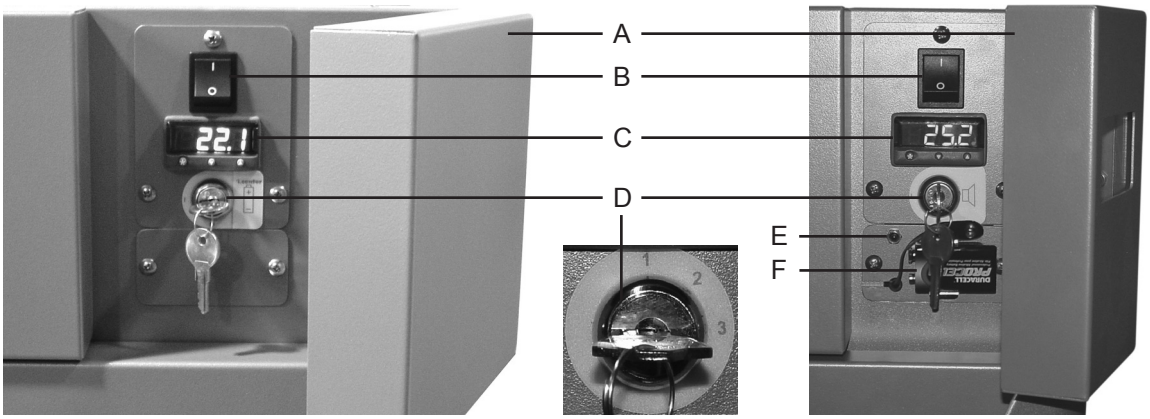
2.1 Touring the front and right side



Left: Sample floor model (PC4200i model shown). Middle top: Sample countertop model (PC100h model shown). Middle bottom: Right side of floor models. Right: Sample model with hood-style door (PC900i model shown).

Label	Description	Function
A	Chart recorder (Optional feature - may not appear on your incubator)	Records seven days of chamber temperature information
B	i.Center monitoring system (Applies to i.Series models only)	Displays current status information and provides an interface to change alarm setpoints
C	Built-in agitation system (Applies to PC4200 models only)	Holds and organizes items being agitated
D	Control door area	Contains controls for the incubator. For details, see Section 2.1.1, “Touring the control door area.”
E	Door lock	Prevents unauthorized access to the chamber
F	Base (Applies to floor models only)	Contains parts used to change the temperature of the chamber. On PC4200 models, it also contains parts to agitate the storage frame
G	Casters (Applies to floor models only)	Used to move the incubator and lock it into position
H	Condenser grill (Applies to floor models only)	Air intake for the compressor

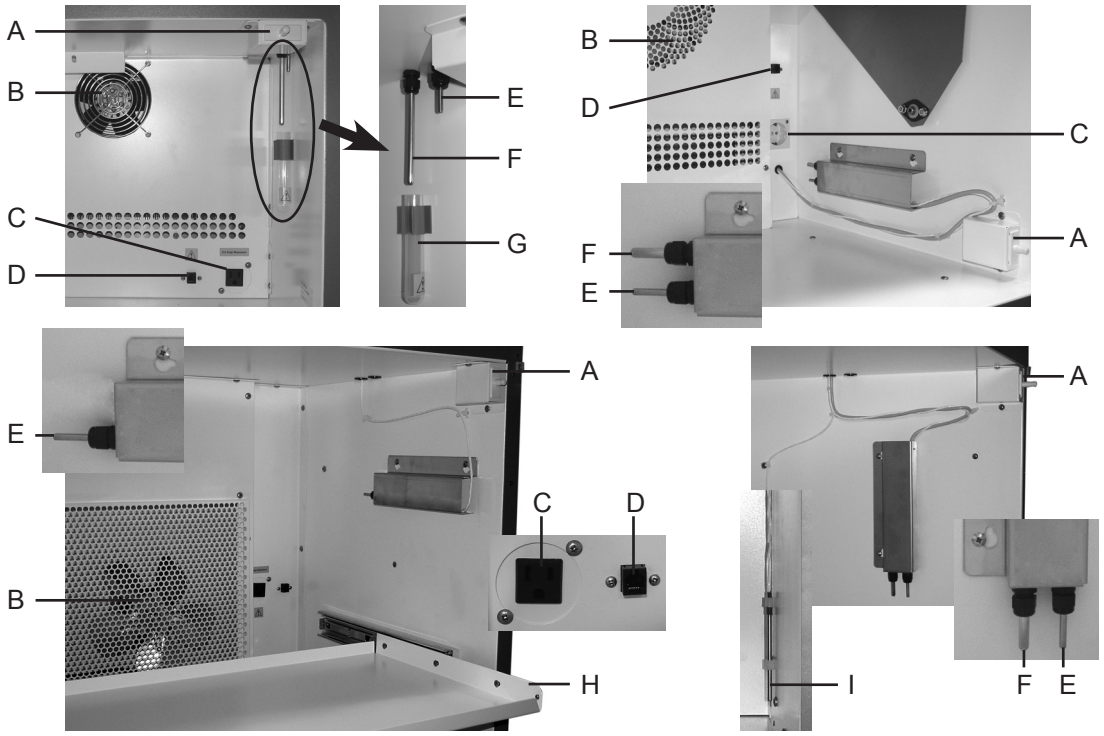
2.1.1 Touring the control door area



Left: Controls for i.Series models (PC2200i model shown). Center: Key switch for PC4200h models. Right: Controls for Horizon Series model (PC100h model shown).

Label	Description	Function
A	Control door	Hides the controls when they are not being used. For Horizon models, the temperature controller is visible through a window in the control door. For i.Series models, the temperature controller is hidden.
B	Main power switch	Powers the incubator on and off. For PC4200 models, it also starts and stops agitation.
C	Temperature controller	Controls the temperature of the chamber. For Horizon Series models, it also displays current status information and provides an interface to change alarm setpoints.
D	Key switch	Varies by model. ► All i.Series models: Enables or disables the power from the backup battery. ► PC4200h models: Enables or disables both the temperature alarm and the motion alarm. ► All other Horizon Series models: Enables or disables the temperature alarm.
E	Mute button (Horizon Series models only)	Temporarily mutes the audible alarm for high or low temperature conditions.
F	Battery for power failure alarm (Horizon Series models only)	Provides power to the power failure alarm if AC power is lost.

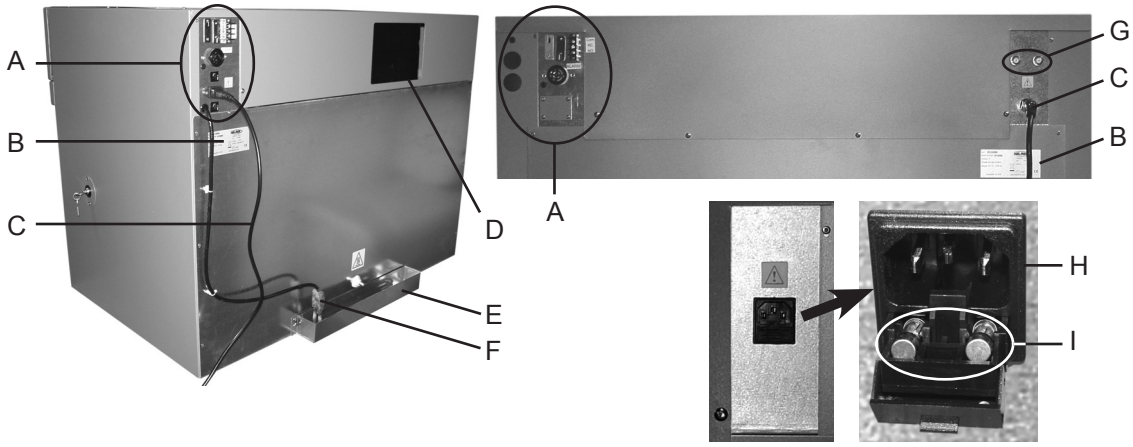
2.2 Touring the chamber



Left top: PC100i 115 V model. Right top: PC900i 230 V model. Left bottom: PC3200h 115 V model. Right bottom: PC4200i model (with agitation system removed to show detail).

Label	Description	Function
A	Door switch	For PC4200 models: Controls power to the built-in agitator. For all other models: Controls power to the interior outlets.
B	Chamber fan	Circulates air in the chamber
C	Interior outlet	Provides power to agitators that are installed in the incubator
D	I/O (input/output) connector	Interface with Helmer i.Series Flatbed Platelet Agitators for motion information and alarms
E	Temperature control and chart recorder probe	Collects temperature data from the top of the chamber for temperature control. This probe is also used for chamber temperature monitoring on Horizon Series models, and to collect temperature data for the chart recorder (if installed).
F	Temperature monitoring probe (Applies to i.Series models only)	Collects temperature data from the chamber for monitoring
G	Tube for alarm checks (Applies to PC100 models only)	Holds liquid that is used during probe tests
H	Shelf, roll-out (Applies to PC2200 and PC3200 models only)	Supports equipment that is installed inside the incubator, such as Helmer Flatbed Platelet Agitators
I	Lower probe (Applies to PC3200i and PC4200i models only)	Collects temperature data from the bottom of the chamber for monitoring

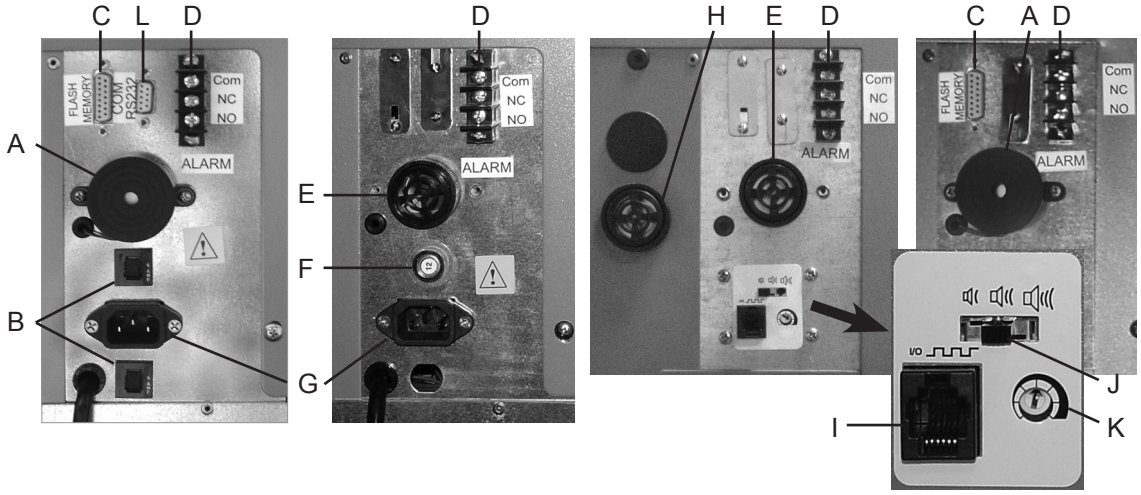
2.3 Touring the rear



Left: Sample countertop model (PC1200h 230 V model shown). Top right: Sample floor model (PC3200h 115 V model shown). Bottom right: Detail of power connector for 230 V floor models.

Label	Description	Function
A	Alarm output area	Contains the alarm buzzer and remote alarm interface. Other features vary by model. For details, see Section 2.3.1, “Touring the alarm output area.”
B	Product Specification label	Provides the model number, serial number, and electrical requirements for the incubator
C	Power cord	Provides AC power to the incubator
D	Condenser grill (Applies to countertop models only)	Air intake for the compressor. The condensing unit is located behind the grill.
E	Water evaporation tray (Applies to countertop models only)	Contains condensate from the condensing unit
F	Condensate evaporator (Applies to countertop models only)	Evaporates water in the water evaporation tray
G	Circuit breakers (Applies to floor models that are 115 V)	Prevents current overload
H	Power connector with fuse holder (Applies to floor models that are 230 V)	Interface for the power cord
I	Fuses (Applies to floor models that are 230 V)	Prevents current overload

2.3.1 Touring the alarm output area



Left: Sample countertop models (PC1200i 230 V and PC100h 115 V shown).
Right: Sample floor models (PC4200h and PC2200i shown, with detail for PC4200h models).

Label	Description	Function
A	Alarm buzzer (Applies to i.Series models only)	Audibly indicates an active temperature, no battery, power failure, or door open alarm. Also indicates when an agitator that is installed in the incubator has stopped.
B	Circuit breakers (Applies to countertop models that are 230 V)	Prevents current overload
C	Flash port (Applies to i.Series models only)	Allows a flash card to be inserted to change the language used for the monitoring software and to update the software
D	Remote alarm interface	Provides a dry contact connection to external central alarm systems
E	Alarm buzzer (Applies to Horizon Series models only)	Audibly indicates an active temperature alarm or power failure alarm
F	Circuit breaker (Applies to countertop models that are 115 V)	Prevents current overload
G	Power connector (Applies to all countertop models)	Interface for the power cord
H	Motion alarm buzzer (Applies to PC4200h models only)	Audibly indicates when the built-in agitator has stopped
I	I/O connector (Applies to PC4200 models only)	Not used
J	Alarm volume control (Applies to PC4200 models only)	PC4200h models: Controls the volume of the audible motion alarm PC4200i models: Not used
K	Alarm delay control (Applies to PC4200 models only)	Delays the communication of the motion alarm
L	RS232 COM port (Optional feature for i.Series models only)	Provides data to external software. Contact Helmer or your local distributor for software availability.

2.4 Touring the top

Top view (PC100 model shown)

Label	Description	Function
A	Service cover	Covers components on top of the incubator
B	Access panel	Provides access to components used for configuring alarms and providing backup power. Applicable components vary by model.

3 Installing the incubator

This section provides an overview and details of the installation process.

3.1 Reviewing installation and configuration tasks

NOTE: Regulations for your organization may require that only designated service personnel complete certain installation and configuration tasks. Follow the guidelines for your organization.

This section is a high-level overview of what needs to be done to prepare the incubator for use. Some steps may vary depending on the model. For more information about each step, see the referenced sections.

To install and configure the incubator

1. Remove all packaging materials from the interior and exterior of the incubator. Be sure to keep the accessories box, which contains items needed for installation.
2. Record identification information (model and serial number) for your incubator. For more information, see Section 3.2, “Recording identification information.”
3. Select an appropriate location for the incubator, then move the incubator into place. For more information and precautions, see Section 3.3, “Selecting an appropriate location” and Section 3.4, “Moving the incubator.”
4. After allowing the incubator to reach room temperature after shipment, connect it to power and turn it on. For i.Series models, load the appropriate languages from the flash memory card if prompted to do so. For more information, see Section 3.5, “Powering the incubator.”
5. For i.Series models, enable backup power for the i.Center monitoring system. For more information, see Section 3.6.1, “Enabling backup power for the i.Center monitoring system.”
6. For Horizon Series models, enable backup power for the power failure alarm system. For more information, see Section 3.6.2, “Enabling backup power for the power failure alarm system.”
7. For PC4200 models, which have a built-in agitator, enable the backup power for the motion alarm system. For instructions, see Section 3.6.3, “Enabling backup power for the motion alarm system.”
8. For PC4200 models, install label holders on the drawers if desired. For more information and instructions, see Section 6.7.2, “Identifying the contents of the agitator drawers.”
9. For PC100 models, install the tube for alarm checks. For more information, see Section 3.7, “Installing the tube for alarm checks.”
10. Confirm that the incubator setpoint, which controls the chamber temperature, is set to the appropriate temperature for your application. For more information and instructions to change it, see Section 3.8, “Configuring the incubator setpoint.”
11. If your incubator has a chart recorder installed, prepare it for use. For an overview of the process, see Section 3.9, “Preparing the chart recorder.” For details about your chart recorder, refer to the Chart Recorder Operation Manual for your incubator.
12. For models other than PC4200 models, set up your agitator or agitators in the incubator. For more information and instructions, see Section 3.10, “Setting up agitators in the incubator.”
13. If you want alarms to be sent to a remote location, connect monitoring devices to the incubator. For more information and instructions, see Section 3.11, “Connecting external monitoring devices.”

14 For i.Series models, review the current configuration for the date, time, language, and temperature formats. Change the formats as needed. For instructions, see Section 4.2, “Viewing current settings” and Section 4.3, “Changing unit and format settings.”

15 Review the current configuration for the high alarm and low alarm setpoints. Change the values as needed. For i.Series models, see Section 4.2, “Viewing current settings” and Section 4.4.1, “Changing the setpoints for temperature alarms.” For Horizon Series models, see Section 5.1, “Viewing and changing the setpoints for temperature alarms.”

16 For Horizon Series models, enable audible alarms. For more information, see Section 6.4.3, Enabling and disabling audible alarms on Horizon Series models.”

17 For Horizon Series models, confirm that the alarm delay period and the alarm volume are set to the appropriate values. For PC4200h models, which have a built-in agitator, confirm that the motion alarm delay period and motion alarm volume are set to the appropriate values. Change them as needed. For more information and instructions, see Section 5.2, “Delaying when alarms are communicated” and Section 5.3, “Changing the volume for audible alarms.”

18 For i.Series models, review the current configuration for the door open timeout, power failure timeout, and condenser temperature setpoint. Change the values as needed. For instructions, see Section 4.2, “Viewing current settings” and Section 4.4, “Changing alarm settings.”

19 For i.Series models, review the current configuration for the motion alarms. For PC4200i models, which have a built-in agitator, confirm that the alarm delay control is set correctly. Change the settings as needed. For instructions, see Section 4.2, “Viewing current settings” and Section 4.4.3, “Changing the settings for motion alarms.”

20 For i.Series models, review the settings for the alarm volume and the alarm pulse. Change them as needed. For instructions, see Section 4.2, “Viewing current settings” and Section 4.4.4, “Changing the audible alarm characteristics.”

21 For i.Series models, review the settings for the chart paper timer and the temperature graph. Change the values as needed. For instructions, see Section 4.2, “Viewing current settings,” Section 4.4.5, “Changing the setting for the chart paper timer,” and Section 4.5, “Enabling and disabling the temperature graph.”

22 For i.Series models, change the password to prevent unauthorized changes to the settings, if desired. For instructions, see Section 4.6, “Changing the password.”

23 Calibrate the temperature controller so that the readout for the chamber temperature matches the temperature of the chamber. For more information and instructions, see Section 7.6, “Calibrating the temperature controller readout.”

24 For i.Series models, calibrate the i.Center so that readout for the temperature monitoring probe matches the temperature of the chamber. For PC3200i and PC4200i models, which each have two monitoring probes, calibrate the readout for the lower probe as well. For more information and instructions, see Section 7.7, “Calibrating temperature readings on the i.Center.”

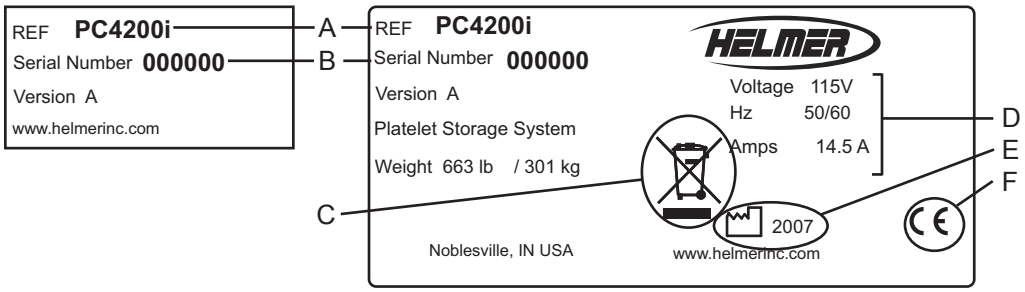
25 Test all alarms to ensure that they are working correctly. For instructions, see Section 7.8, “Testing chamber temperature alarms” through Section 7.12, “Testing the No Battery alarm.”

26 Allow the chamber temperature to stabilize before use.

3.2 Recording identification information

For easy reference, write the model and serial number on the front of this manual. Many of the procedures in this manual vary by model, and both the model and serial numbers are needed to provide efficient service.

Product information appears in two places on the incubator: on the Product Specification label, which is located on the rear of the incubator below the power connector, and on a label located in the chamber.



Sample product identification labels. Left: Label in chamber. Right: Label on rear.

Label	Description
A	Model
B	Serial number (S/N)
C	WEEE symbol. For more information, see Section 9.3.6, “Energy conservation and regulatory compliance.”
D	Power requirements
E	Date of manufacturing
F	CE symbol. For more information, see Section 9.3.6, “Energy conservation and regulatory compliance.”

3.3 Selecting an appropriate location

To optimize operation, the location for your incubator must meet the following requirements, as well as any additional requirements specified for your organization:

- A sturdy, level surface to provide support and proper movement, and to allow the doors to self-close and the chamber to drain properly
- Is clear of direct sunlight, high temperature sources, heating vents, and air conditioning vents
- Countertop models only: Has a minimum of 4 in (10 cm) of space above and behind the incubator for unobstructed ventilation
- Floor models only: Has a minimum of 4 in (10 cm) of space on the left and right sides of the incubator for unobstructed ventilation
- Has access to a grounded outlet that meets the power requirements as listed on the Product Specification label
- Meets the limits that are specified for ambient temperature and relative humidity. For more information, see Section 9.3.4, “Operating conditions.”

3.4 Moving the incubator

Floor model incubators have locking swivel casters, enabling them to be rolled and locked into place.

WARNING:

- The incubator may be too heavy or awkward for you to move alone. Get assistance as needed.
- Countertop models: When moving the incubator, do not use the water evaporation tray, located on the rear of the incubator, as a handle. Avoid contact with the tray as it may be hot.
- Floor models: Before moving the incubator, ensure that all the casters are unlocked and that the doors are closed. When moving the incubator, push from the sides of the incubator, not from the front or back. Pushing from the front or back could cause the incubator to tip if the wheels become stuck.

3.5 Powering the incubator

This section explains how to connect the incubator to the main power source and turn the power on and off.

3.5.1 Connecting to AC power

The power cord for all countertop models and 230 V floor models is located in the accessories box that is shipped with the incubator. For all models except the PC4200 models, the accessories box includes one or more additional shorter power cords, each of which is used to provide power to a Helmer agitator when it is installed inside the incubator.

To connect to AC power

CAUTION: As with any electronic device, before connecting to power, make sure that the incubator is at room temperature.

1. (All countertop models and 230 V floor models only): Connect one end of the power cord to the power connector on the incubator.
2. Plug the power cord into a grounded outlet that meets the power requirements that appear on the Product Specification label on the incubator.

3.5.2 Turning AC power on and off

NOTE: When the power is turned on, the chamber temperature may exceed the high temperature alarm setpoint, which will cause an alarm to sound. When normal operating temperature is reached, the alarm clears automatically. For information and instructions to mute or disable the alarm, see Section 6.4, “Controlling the sound for audible alarms.”

For i.Series models, each time you turn on the power you are given the option to select the language used to display text on the monitoring system. The monitoring system can store two languages, which are loaded from the flash memory card. By default, only English is loaded and selected. If you want to use a language other than English, it must first be loaded from the flash memory card to be stored on the monitoring system. If a flash memory card is not included with your incubator, your distributor may have loaded the appropriate languages prior to shipment. For more information about available languages and instructions for loading them, refer to the documentation provided with the flash memory card or contact Helmer or your local distributor.

To turn the power on (i.Series models)

1. Confirm that the incubator is connected to AC power.
2. On the front of the incubator, open the control door, then press the main power switch to the On (|) position. The monitoring system lights up and the SYSTEM OPTIONS screen appears with the text displayed in the most recently selected language. The Language setting is highlighted, and the language currently being used is selected. For PC4200i models, the built-in agitator starts agitating and the backup battery for the motion alarm starts charging.
3. If an alarm sounds, mute the alarm by pressing the MUTE button, which is located on the monitoring system.
4. If you want to select a different language, press the INC or DEC button until the language that you want to use appears.
5. Press the HOME button. The HOME screen appears. Display text for all screens changes to the language you selected.

To turn the power on (Horizon Series models)

1. Confirm that the incubator is connected to AC power.
2. On the front of the incubator, open the control door, then press the main power switch to the On (|) position. The current temperature of the chamber appears on the temperature controller. For PC4200h models, the built-in agitator starts agitating and the backup battery for the motion alarm starts charging.
3. If an alarm sounds, mute it temporarily by pressing the Mute button, which is located next to the backup battery.

To turn the power off

► Press the main power switch to the Off (O) position.

3.6 Enabling backup power

Certain systems on the incubator have backup batteries, enabling them to continue operating if AC power to the incubator is lost.

For information about the backup battery for the chart recorder, see Section 3.9, “Preparing the chart recorder.”

3.6.1 Enabling backup power for the i.Center monitoring system

NOTE: This section only applies to i.Series models.

Backup batteries enable the i.Center monitoring system to continue operating if AC power to the incubator is lost. While running on backup power, the monitoring system will continue to monitor the status of the incubator and activate all alarms as appropriate.

When the battery backup system is properly configured, the monitoring system can continue operating on backup power. However, AC power must be connected and turned on to start the monitoring system.

Battery life varies by battery manufacturer and the voltage level remaining on the batteries. Providing that no battery-related alarms are active, backup power for the monitoring system is provided for two hours. For more information about battery-related alarms, see Section 9.2, “Alarm reference.”

The batteries are located under the access panel on top of the incubator. For more information about replacing batteries, see Section 7.2.1, “Checking and replacing batteries for the i.Center monitoring system.”

To enable backup power for the i.Center monitoring system

WARNING: Removing the access panel from the incubator exposes you to the risk of electric shock. Regulations for your organization may require that only designated service personnel remove the access panel. Follow the guidelines for your organization.

1. Turn off the incubator and disconnect it from AC power.
2. Confirm that the backup batteries are installed. Incubators are shipped from the factory with the batteries installed. The batteries are located on top of the incubator under the access panel.
3. Using the alarm key, turn the key switch to the On (|) position. The key is shipped from the factory in the accessories box, and the key switch is located on the front of the incubator behind the control door.

3.6.2 Enabling backup power for the power failure alarm system

NOTE: This section only applies to Horizon Series models.

The power failure alarm system has a backup battery, which enables the alarm to be activated if AC power to the incubator is lost.

The battery is located behind the control door on the front of the incubator. Depending on the model, you may need to connect the leads to the battery. For more information about replacing the battery, see Section 7.2.2, "Testing and replacing the battery for the power failure alarm."

To enable backup power for the power failure alarm system

► Confirm that the backup battery for the power failure alarm is installed and that the leads are connected.

3.6.3 Enabling backup power for the motion alarm system

NOTE: This section applies only to PC4200 models, which have a built-in agitator.

The built-in agitator has a motion alarm system that is independent of other alarms on the incubator. The motion alarm system has a battery backup, which enables it to continue operating if power to the incubator is lost.

Unlike other backup batteries for the incubator, the battery for the motion alarm system is rechargeable. The battery charges continuously while the incubator is receiving AC power and the incubator is turned on.

If the incubator were to lose AC power, agitation would stop; however, the backup battery would continue to power the motion alarm system and thereby activate the motion alarm. The amount of time that the alarm system can function on battery power depends on the charge that remains on the battery.

The incubator is shipped from the factory with the battery installed. For more information about replacing the battery, see Section 7.2.3, "Testing and replacing the battery for the motion alarm."

To enable backup power for the motion alarm system (PC4200 models only)

WARNING: Removing the access panel from the incubator exposes you to the risk of electric shock. Regulations for your organization may require that only designated service personnel remove the access panel. Follow the guidelines for your organization.

1. Turn off the incubator and disconnect it from AC power.
2. Confirm that the backup battery for the motion alarm is installed. Incubators are shipped from the factory with the battery installed. The battery is located on top of the incubator under the access panel.
3. Connect the incubator to AC power and turn on the power. The backup battery charges to enable backup power for the motion alarm system.

3.7 Installing the tube for alarm checks

NOTE: This section applies only to PC100 models.

The accessories box for PC100 models includes a tube that is used for alarm checks. This tube must be installed so that the chamber temperature alarms can be tested. Slide the tube so that it is below the probe.

CAUTION: Leaving the probe covered during operation prevents the probe from accurately reading the chamber temperature.

Tube installed. Left: PC100i model. Right: PC100h model.

3.8 Configuring the incubator setpoint

The incubator setpoint is used by the temperature controller to adjust the chamber temperature of the incubator. The compressor runs and cools the chamber as long as the incubator is receiving AC power and turned on. The temperature controller senses the temperature in the chamber through the temperature control probe. If the chamber temperature goes below the incubator setpoint, the temperature controller activates the chamber heater until the chamber temperature returns to the setpoint.

At the factory, the incubator setpoint is set at 22.0 °C. You may need to change the setpoint if your organization requires a different normal chamber temperature.

NOTE: Depending on purchasing requirements for your organization, the default setpoint may be a value other than 22.0 °C. Be sure to verify the default setting for your incubator and note any differences for future reference.

To configure the incubator setpoint

CAUTION: Do not change the refrigerator setpoint to a value outside the temperature control range. For more information, see Section 9.3.4, “Operating conditions.”

1. Determine what the normal temperature for the chamber should be. The factory has determined the normal temperature to be 22.0 °C, but it may be different for your organization.
2. On the front of the incubator, open the control door to access the temperature controller. The current temperature of the chamber appears on the display. The current temperature may be different from the setpoint, especially if the chamber temperature has not yet stabilized.

Temperature controller display and buttons

3 On the temperature controller, access the setpoint adjustment function by pressing and holding the button on the left (*). The control display shows the current setpoint value.
4 While holding the button on the left (*), use the middle and right buttons to adjust the incubator setpoint.
   ► Press and release the middle button once to decrease by 0.1 °C.
   ► Press and release the right button once to increase by 0.1 °C.
5 When you are done adjusting the setpoint, release all the buttons. The setpoint is changed.

3.9 Preparing the chart recorder

NOTE: This section only applies if your incubator has a chart recorder installed.

Details for each preparation step may vary by chart recorder. For more information and instructions, refer to the Chart Recorder Operation Manual for your incubator.

To prepare the chart recorder

1 On the front of the incubator, on the left side, pull the chart recorder door open.
2 Connect the leads to the backup battery. The incubator is shipped from the factory with the battery installed but disconnected.
3 Verify that the temperature range is set for incubators. The incubator is shipped from the factory with the range set correctly.
4 Install chart paper. The accessories box, which is shipped with the incubator, contains chart paper.
5 Run a test pattern to verify that the mechanics of the chart recorder are working correctly.
6 Calibrate the chart recorder to match the temperature that is being read by the temperature probe for the chart recorder. The chart recorder is calibrated at the factory prior to shipment.

3.10 Setting up agitators in the incubator

NOTE: This section does not apply to PC4200 models, which have a built-in agitator.

This section explains how to set up countertop model Helmer agitators inside the incubator.

CAUTION: The maximum current draw for each internal outlet is 0.5 A. Do not plug in any device that exceeds this rating.

3.10.1 Understanding model compatibility for Helmer agitators and incubators

i.Series countertop agitators (PF15i, PF48i, and PF96i) have a built-in motion alarm system and can be placed in either i.Series or Horizon Series incubators. When the side-to-side movement of the agitator is not detected, an alarm on the agitator sounds.

When placed in an i.Series incubator, the i.Series agitator can be monitored by the incubator's AgiTrak system, a feature that is only available on i.Series incubators. The AgiTrak system receives alarm information through a direct connection to the agitator's alarm system, then communicates those alarms.

When placed in a Horizon Series incubator, the i.Series agitator cannot be monitored by the incubator. If the agitator stops moving, the alarm on the agitator sounds; however, because the agitator is inside the incubator, the sound level may be lower than desired. An extension to the alarm system may be desired for this configuration.

Horizon Series agitators (PF15h, PF48h, and PF96h) are not equipped with an alarm system, and may be placed in Horizon Series incubators. If Horizon Series agitators are placed in i.Series incubators, users may mistakenly think that the incubator's AgiTrak system will detect if motion has stopped, even though there is no means of detecting it. Therefore, Horizon Series agitators are not recommended for use in i.Series incubators.

The following table explains which agitators can be placed inside Helmer incubators:

These agitators		Can be placed in these Helmer incubators
i.Series	PF15i	PC100h, PC100i
	PF48i	PC900h, PC900i
	PF96i	PC1200h, PC1200i, PC2200h, PC2200i, PC3200h, PC3200i
Horizon Series	PF15h	PC100h
	PF48h	PC900h
	PF96h	PC1200h, PC2200h, PC3200h

3.10.2 Setting up a Helmer agitator inside an incubator

PC900i incubator with a PF48i agitator

Size limitations and the presence of an alarm system determine which Helmer agitator models can be placed in which incubator models. For more information, see Section 3.10.1, "Understanding model compatibility for Helmer agitators and incubators."

The PC100, PC900, and PC1200 model incubators can each hold one agitator. In the back of the chamber of each of these models, there are one power connector and one I/O (input/output) connector. The PC2200 and PC3200 model incubators can each hold one agitator per shelf. Each shelf has a corresponding power connector and I/O connector. The I/O connector is only used with Helmer i.Series agitators, which have a corresponding I/O port to connect to it.

When installing an agitator on a shelf in PC2200 and PC3200 models, use the corresponding power connector to prevent obstructions from the power cord. When installing an i.Series agitator, use the corresponding I/O connector so that agitation information is tracked appropriately. The shelves on the incubator can be rolled out for easier installation.

To locate connectors on the agitator, refer to the Platelet Agitator Operation Manual.

You must have the following to set up a Helmer agitator inside your incubator:

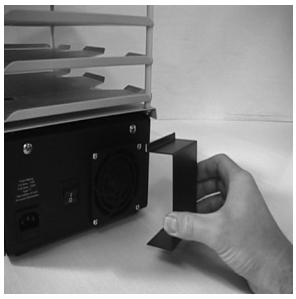
- Power cord. For each agitator, use the short power cord supplied with the incubator instead of the cord supplied with the agitator. The power cord is shipped in the accessories box. Using the shorter cord reduces the amount of excess cord, which could prevent proper placement and obstruct movement.
- (PF15 models set up in PC100 model incubators only): Fan airflow deflector. The deflector is shipped in the accessories box for PC100 model incubators. Warm air from the fan could make the bottom shelf warmer than the rest of the chamber. Installing the deflector redirects the airflow to maintain an even temperature.
- (i.Series model incubators only) I/O (input/output) cable. One I/O cable per shelf is shipped with the incubator in the accessories box.

To set up a Helmer agitator inside the incubator

CAUTION:

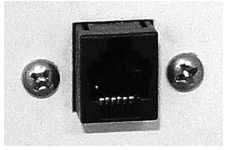
- As with any electronic device, before connecting to power, make sure that the agitator is at room temperature.
- When lifting the agitator, hold the agitator on the ends rather than in the middle. Lifting from the middle may cause the frame to bow and affect operation. For more information, refer to the Flatbed Platelet Agitator Operation Manual.
- When installing an agitator in a PC3200 model, do not roll out more than one shelf at a time.

1. For i.Series agitator models, do the following on the agitator:
   a. Confirm that the backup battery for the alarm system is installed.
   b. Disable the motion alarm by pressing the motion alarm switch to the Off (○) position.
2. Disconnect the power to the incubator.
3. (PF15 models set up in PC100 model incubators only) Install the fan airflow deflector on the agitator.
   a. On the deflector, remove the backing on the adhesive strips.
   b. Position the deflector so the open side faces the rear of the agitator, then press the deflector into place around the fan.



Installing the fan deflector on a PF15 model agitator

4. Place the agitator inside the incubator, centering it so that the storage frame can move freely and the incubator door or doors can fully close. Make sure that the fan on the agitator is not obstructed. On floor models, you can roll out the shelf for easier access.
5. (i.Series models only) Connect one end of the I/O cable to the I/O port on the agitator, and the other end to the corresponding I/O connector inside the incubator.



I/O connector inside an incubator

6 Connect one end of the power cord to the power connector on the agitator, and the other end to the corresponding outlet inside the incubator.
7 Connect the power to the incubator. For i.Series model agitators, the backup battery for the motion alarm in the agitator charges upon connection, and continues charging as long as the door or doors of the incubator are closed.
8 Turn on the agitator and close the door or doors of the incubator. Verify that the agitator does not contact the sides of the incubator while in motion.

3.11 Connecting external monitoring devices

CAUTION: Do not connect a monitoring device if it exceeds the maximum load capacity for your model. For more information, see Section 9.3.1.5, "Load capacity for alarm contacts."

The Helmer incubator provides connectors to send information to external devices.

For more information about the location of the ports and connectors, see Section 2.3, "Touring the rear."

3.11.1 Connecting to the remote alarm interface

The remote alarm interface is a relay switch with three terminals: Common (COM), Normally Open (NO), and Normally Closed (NC). These terminals are dry contacts and do not supply voltage. The interface circuit is either normally open or normally closed depending on which terminals are used.

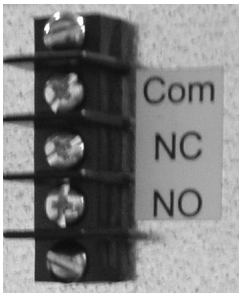
For PC2200i and PC3200i models, a bypass plug may be needed for a normally closed interface circuit. This plug is only needed if multiple agitators are installed and not all the agitators are Helmer i.Series. For each position in which a non-Helmer i.Series agitator is installed, this plug must be installed in the I/O connector. To obtain a bypass plug, contact Helmer or your local distributor.

For a list of alarms that are provided through the remote alarm interface, see Section 9.2, "Alarm reference."

The requirements for your alarm system determine which wires must connect to which terminals.

To connect to the remote alarm interface

1 Disconnect the power from the incubator.
2 Do one of the following:
   ► i.Series models: On the front of the incubator, behind the control door, turn the key switch to the Off (○) position to disable the backup power to the monitoring system.
   ► Horizon Series models: Disconnect the backup battery for the power failure alarm.
3 On the rear of the incubator, in the alarm output area, locate the remote alarm interface.



Remote alarm interface

4 Connect the wires to the appropriate terminals according to the requirements for your alarm system.
5 Using a cable tie, secure the wires together for stability (as needed).
6 Enable the backup power and reconnect the power to the incubator.

4 Preparing the monitoring system on i.Series incubators

NOTE: This section only applies to i.Series models.

This section provides an overview of the i.Center independent monitoring system, and explains how to use it to view and change alarm setpoints.

4.1 Touring the i.Center monitoring system

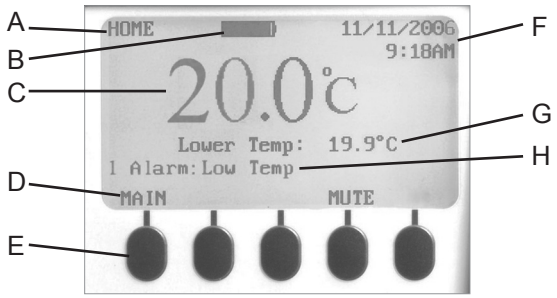
This section provides an overview of the major screens and features of the i.Center monitoring system.

4.1.1 Touring the HOME screen

The HOME screen displays current information and is the starting screen for all interaction with the monitoring system.

The HOME screen appears in the following circumstances:

- ► When the HOME button is pressed from any other screen
- ► When there is no interaction for two minutes on any screen other than those used to enter the password.



HOME screen on the monitoring system (PC3200i model shown)

Label	Description	Function
A	Screen name	Identifies the current screen
B	Battery voltage level	Displays information about the remaining life of the backup batteries for the monitoring system
C	Upper chamber temperature display	Displays the current temperature sensed by the upper temperature probe
D	Button labels	Displays the option assigned to the button below it. These labels vary depending on the screen.
E	Buttons	Selects menu options in the monitoring system software
F	Date and time display	Displays the current date and time as programmed in the monitoring system
G	Lower chamber temperature display (Only appears on PC3200i and PC4200i models)	Displays the current temperature sensed by the lower temperature probe
H	Active alarm display	Indicates the number and description of alarm conditions that have been reached

4.1.1.1 Understanding functions available from the HOME screen

NOTE: For a list of the options available on all the screens, see Section 9.1, "i.Center monitoring system screen reference."

From the HOME screen, you can do the following:

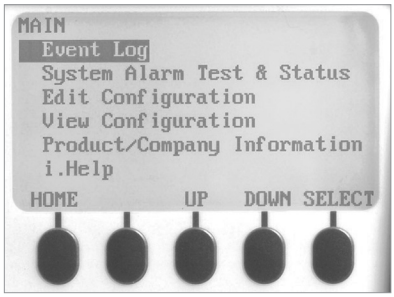
- ► View current readings from the temperature probes
- ► View the remaining battery charge
- ► View the current time and date for the system
- ► Access the MAIN screen, through which you can view and change settings
- ► Adjust the contrast
- ► View active alarms
- ► Mute audible alarms
- ► View a graph of the chamber temperature for the past 24 hours of operation

4.1.2 Touring the MAIN screen

The MAIN screen displays the options available in the monitoring system. From this screen, you can access all other screens in the monitoring system.

To navigate to the MAIN screen

- ► From the HOME screen, press the MAIN button. The MAIN screen appears.



MAIN screen on the monitoring system

To select an option from the MAIN screen

1. Press the UP or DOWN button until the option that you want to select is highlighted.
2. Press the SELECT button.

4.1.2.1 Understanding options available from the MAIN screen

NOTE: For a list of the options available on all the screens, see Section 9.1, "i.Center monitoring system screen reference."

The options available from the MAIN screen are as follows:

Select this option	To do this
Event Log	Access the EVENT LOG screen ► View historical information about alarms and operational events
System Alarm Test & Status	Access the SYSTEM ALARM TEST & STATUS screen ► Start or stop an automatic test for temperature alarms ► View the number of days remaining before the paper for the chart recorder needs to be changed ► View the current status of the door (OPEN or CLOSED) ► View the current condenser temperature
Edit Configuration	Access the CONFIGURATION screen (password required) ► Change the language used for text ► Change date and time information ► Change temperature units ► Change the volume and pattern for audible alarms ► Enable or disable the chart paper timer ► Enable or disable the temperature graph display ► Change alarm-related setpoints and timers ► Calibrate the temperature probe reading ► Change certain settings to the default values set by the factory ► Change the password, preventing unauthorized changes ► Configure the AgiTrak system to monitor agitation
View Configuration	Access the VIEW CONFIGURATION screen ► View the date and time formats ► View alarm-related setpoints and timers ► View the volume and pattern for audible alarms ► View the setting for the chart paper timer ► View the setting for the temperature graph display ► View the settings for agitator alarms
Product/Company Information	Access the INFORMATION screen ► View the software versions for control and display components of the monitoring system ► View information to contact Helmer
i.Help	Access the i.Help screen ► Access the on-board help system ► View real-time and historical agitation information ► Reset cycle counters for agitators

4.2 Viewing current settings

Through the monitoring system, you can view some of your current settings.

To view current settings

► Access the VIEW CONFIGURATION screen.

a From the HOME screen, press the MAIN button. The MAIN screen appears.

b From the MAIN screen, use the buttons to navigate to and select the View Configuration option. The VIEW CONFIGURATION screen appears with a list of current settings.

The settings that appear on the VIEW CONFIGURATION screen are as follows:

Setting	Description
Clock mode	The format used to display the time on the HOME screen and on the Event Log
Date format	The format used to display the date on the HOME screen and on the Event Log
Door Ajar Timeout	The number of minutes the door can be open before an alarm activates
Pwr Failure Timeout	The number of minutes the incubator can be without AC power before an alarm activates
High Alarm Setpoint	The temperature at which the High Temperature Alarm should activate
Low Alarm Setpoint	The temperature at which the Low Temperature Alarm should activate
Cond. Alarm Setpoint	The temperature at which the Condenser Temperature Alarm should activate
Alarm Volume	The volume for audible alarms
Alarm Pulse	The pattern for audible alarms
Chart Paper Timer or Chart Paper Days Left	The setting for the chart paper timer (if it is disabled), or the number of days remaining before the chart paper needs to be changed (when applicable)
Temperature Graph	The setting for the temperature graph feature (Enabled or Disabled)
Agitator Alarms	The settings for the motion alarm for each Helmer i.Series agitator that is installed in the incubator, or the built-in agitator on PC4200i models. All incubators are programmed to monitor three positions, even though some models accommodate fewer agitators. Positions that are not in use are set to OFF. Positions that are in use are set to ON and display the number of minutes the agitator can be stopped before an alarm activates.

4.3 Changing unit and format settings

You can change the display language, the date format, and the time format.

4.3.1 Changing the display language

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, "Changing the password."

You can change the language that is used to display text to any stored language.

The monitoring system can store two languages, which are loaded from the flash memory card. By default, only English is loaded and selected. If you want to use a language other than English, it must first be loaded from the flash memory card to be stored on the monitoring system. If a flash memory card is not included with your incubator, your distributor may have loaded the appropriate languages prior to shipment. For more information about available languages and instructions for loading them, refer to the documentation provided with the flash memory card or contact Helmer or your local distributor.

To change the display language

1. Access the CONFIGURATION screen.
   - **a** From the HOME screen, press the MAIN button. The MAIN screen appears.
   - **b** Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   - **c** Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2. From the CONFIGURATION screen, use the buttons to navigate to and select the System Options option. The SYSTEM OPTIONS screen appears with the Language setting highlighted.
3. Press the INC or DEC button until the language that you want to use appears.
4. Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen. The setting is saved. Display text for all screens changes to the language you selected.

4.3.2 Changing date and time information

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, "Changing the password."

You can change the current date and time settings and the format used to display them. The date and time are displayed on the HOME screen and in the Event Log.

The Date Format setting controls the order in which the month (mm) and day (dd) are displayed. The year (yyyy) is always displayed last. The month setting is a two-digit number (01-12) representing the month. The day setting is a two-digit number (01-31) representing the day. The default format set by the factory is mm/dd/yyyy.

The Clock Mode setting controls whether the time is displayed in a 12-hour or 24-hour format. For both settings, you can change the hour and minute values. If you are using the 12-hour format, you must also specify whether the time is AM or PM. The default format set by the factory is 12-hour.

To change date and time information

1 Access the CONFIGURATION screen.
   a From the HOME screen, press the MAIN button. The MAIN screen appears.
   b Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   c Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2 From the CONFIGURATION screen, use the buttons to navigate to and select the Set Date & Time option. The SET DATE & TIME screen appears with the Date Format setting highlighted.
3 Press the DOWN button until the setting that you want to change is highlighted.
4 Press the INC or DEC button until the new value that you want to use appears.
5 To change other settings on this screen, repeat steps 3-4.
6 Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen. The setting is saved.

4.3.3 Changing the temperature units

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, “Changing the password.”

You can change the measurement system used to display the temperature. The default units set by the factory is Celsius (°C). Available options are Celsius or Fahrenheit (°F).

To change the temperature units

1 Access the CONFIGURATION screen.
   a From the HOME screen, press the MAIN button. The MAIN screen appears.
   b Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   c Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2 From the CONFIGURATION screen, use the buttons to navigate to and select the System Options option. The SYSTEM OPTIONS screen appears with the Language setting highlighted.
3 Press the DOWN button until the Temperature Units setting is highlighted.
4 Press the INC or DEC button until the units that you want to use appears.
5 Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen. The setting is saved.

4.4 Changing alarm settings

You can change the settings for alarms.

4.4.1 Changing the setpoints for temperature alarms

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, “Changing the password.”

The monitoring system has alarms which are activated if the temperature is too high or too low.

The High Alarm setpoint specifies the temperature at which the High Temperature Alarm should activate. If the temperature that is detected by the upper chamber probe is greater than or equal to this value, the alarm activates. The default setpoint set by the factory is 24 °C. The setpoint can be changed to a value from -40 °C to 40 °C, inclusive.

The Low Alarm setpoint specifies the temperature at which the Low Temperature Alarm should activate. If the temperature that is detected by the upper chamber probe is less than or equal to this value, the alarm activates. The default setpoint set by the factory is 20 °C. The setpoint can be changed to a value from -40 °C to 40 °C, inclusive.

The Cond. Alarm setpoint specifies the temperature at which the Condenser Temperature Alarm should activate. If the temperature of the condenser discharge line is greater than or equal to this value, the alarm activates. The default setpoint set by the factory is 50 °C. The setpoint can be changed to a value from -40 °C to 80 °C, inclusive.

To change the setpoint for a temperature alarm

1. Access the CONFIGURATION screen.
   - **a** From the HOME screen, press the MAIN button. The MAIN screen appears.
   - **b** Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   - **c** Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2. From the CONFIGURATION screen, use the buttons to navigate to and select the Alarm Setpoints option. The SET ALARM SETPOINT screen appears with the High Alarm Setpoint setting highlighted.
3. Press the DOWN button until the setting that you want to change is highlighted.
4. Press the INC or DEC button until the new value that you want to use appears.
5. Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen. The setting is saved.

4.4.2 Changing the setpoints for the door open and power failure alarms

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, “Changing the password.”

The Door Ajar Timeout specifies the longest time the incubator door or doors can be open prior to alarm. If the time that has elapsed since the last time door was opened is greater than or equal to this value, an alarm activates. The default setpoint set by the factory is 3 minutes. The setpoint can be changed to any value, in increments of 1 minute, from 0 to 60 minutes, inclusive.

The Power Failure Timeout specifies the longest time the incubator can be without AC power prior to

alarm. If the time that has elapsed since power failure is greater than or equal to this value, an alarm activates. The default setpoint set by the factory is 3 minutes. The setpoint can be changed to any value, in increments of 1 minute, from 0 to 60 minutes, inclusive.

For information about changing setpoints for motion alarms for installed agitators or built-in agitator, see Section 4.4.3, “Changing the settings for motion alarms.”

To change the setpoints for the door open and power failure alarms

1. Access the CONFIGURATION screen.
   a. From the HOME screen, press the MAIN button. The MAIN screen appears.
   b. Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   c. Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2. From the CONFIGURATION screen, use the buttons to navigate to and select the Alarm Setpoints option. The SET ALARM SETPOINT screen appears with the High Alarm Setpoint setting highlighted.
3. Press the DOWN button until the setting that you want to change is highlighted.
4. Press the INC or DEC button until the new value that you want to use appears.
5. To change other settings on this screen, repeat steps 3-4.
6. Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen. The setting is saved.

4.4.3 Changing the settings for motion alarms

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, “Changing the password.”

The AgiTrak system is part of the i.Center monitoring system. The AgiTrak system receives and monitors agitation information from each i.Series agitator that is installed in it, or from the built-in agitator for PC4200i models.

The AgiTrak system monitors three agitator positions simultaneously, although fewer positions may actually be available depending on the incubator model. Each position has its own number to distinguish them: the topmost available position is always numbered 1, as is the built-in agitator on the PC4200i model.

PC100i, PC900i, and PC1200i models each have one available position, while the PC2200i has two and the PC3200i has three. The incubator has an I/O connector for each available position, through which the AgiTrak system receives speed information from the installed agitator or agitators. The built-in agitator on the PC4200i model transmits speed information directly to the AgiTrak system.

For each agitator position, the AgiTrak system monitors the current agitation speed. If no motion is detected for the pre-configured amount of time, the AgiTrak system activates an alarm and records alarm event information in the event log.

For agitation information to be monitored correctly, each corresponding position must be enabled. If a position is not available, not in use, or has a Horizon Series agitator connected, it should be disabled to prevent false alarms. For example, because a PC100i model only has one position, positions 2 and 3 should be disabled. The available values for this setting are ON (enabled) and OFF (disabled). At the factory, the setting is set to ON for all available agitator positions, and OFF for all others.

The Agitator Alarm Setpoint for each agitator specifies the longest time that the agitator can be stopped prior to alarm. If the time that has elapsed since the corresponding agitator stopped is greater than or equal

to this value, an alarm activates. The default setpoint set by the factory is 3 minutes. The setpoint can be changed to any value, in increments of 1 minute, from 0 to 60 minutes, inclusive.

The AgiTrak system is intended to replace the alarm system for each i.Series agitator that is installed in the incubator. For each agitator that is being monitored by the AgiTrak system, the alarm system on the agitator itself should be disabled to prevent confusion from multiple alarms.

For additional instructions for PC4200i models, see Section 4.4.3.1, "Changing the delay period for PC4200i models."

To change settings for motion alarms

1. Access the CONFIGURATION screen.
   - **a** From the HOME screen, press the MAIN button. The MAIN screen appears.
   - **b** From the MAIN screen, use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   - **c** Using the buttons, enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2. From the CONFIGURATION screen, use the buttons to navigate to and select the Alarm Setpoints option. The SET ALARM SETPOINT screen appears with the High Alarm Setpoint setting highlighted.
3. From the SET ALARM SETPOINT screen, use the buttons to navigate to and select the Agitator Alarm Setpoints option. The AGITATOR ALARM SETPOINT screen appears with the Agitator 1 Setpoint setting highlighted.
4. Press the Down button until the setting that you want to change is highlighted.
5. Press the INC or DEC button until the new value that you want to use appears.
6. Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen. The setting is saved.

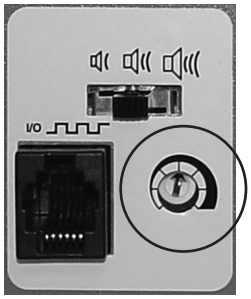
4.4.3.1 Changing the delay period for the motion alarm for PC4200i models

NOTE: This section only applies to PC4200i models, which have a built-in agitator.

Unlike other i.Series models, the PC4200i model has an alarm delay control. When the agitator stops, this control delays when alarm information is sent directly to the remote alarm interface on the incubator, but does not delay when speed information is sent to the AgiTrak system. When the Agitator Alarm Setpoint is reached, the AgiTrak system activates an alarm, which is also sent to the remote alarm interface on the incubator.

To prevent confusion from an alarm being communicated by an external monitoring device but not by the incubator, make sure that the alarm delay control is set to a value that is greater than the Agitator 1 Setpoint.

The alarm delay control for the motion alarm is located on the rear of the incubator. For more information, see Section 2.3.1, "Touring the alarm output area."



Alarm delay control for the motion alarm (circled)

The delay period can be set to a value between 0 and 8 minutes. At the factory, the delay period is set at the halfway point (approximately 4 to 5 minutes). Acceptable tolerance is as established by your organization.

You must have the following to change the delay period:

► Small flat-head screwdriver

To change the delay period for the motion alarm

1. Using the screwdriver, turn the alarm delay control counter-clockwise until it stops. This decreases the delay period to 0 minutes.
2. Using the screwdriver, increase the delay period by turning the alarm delay control clockwise to the appropriate position (greater than the value for the Agitator 1 Setpoint). Turning the control clockwise until it stops will set the delay period to approximately 8 minutes.

4.4.4 Changing the audible alarm characteristics

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, "Changing the password."

You can change the volume and pattern for audible alarms. This is useful if you have several pieces of equipment with alarms and want to be able to distinguish the source of the alarm quickly.

The Alarm Volume specifies the volume for all audible alarms for the incubator. The default value set by the factory is 10. The volume can be changed to any value, in increments of 1, from 1 to 10, inclusive. 1 is the quietest level, while 10 is the loudest.

The Alarm Pulse specifies the sound-silence pattern for all audible alarms for the incubator. The default value set by the factory is Single. The available patterns are Constant (continuous sound), Single (pattern of one beep followed by silence), Double (two beeps then silence), and Triple (three beeps then silence).

To change the audible alarm characteristics

1. Access the CONFIGURATION screen.
   a. From the HOME screen, press the MAIN button. The MAIN screen appears.
   b. Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   c. Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2. From the CONFIGURATION screen, use the buttons to navigate to and select the System Options option. The SYSTEM OPTIONS screen appears with the Language setting highlighted.
3. Press the DOWN button until the setting that you want to change is highlighted.
4. Press the INC or DEC button until the new value that you want to use appears.
5. To change other settings on this screen, repeat steps 3-4.
6. Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen. The setting is saved.

4.4.5 Changing the setting for the chart paper timer

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, "Changing the password."

If your incubator has a chart recorder, you can set a visual alarm to activate when the paper needs to be changed.

One piece of chart paper records temperatures continuously for seven days. The monitoring system has a timer that activates an alarm exactly 6.5 days from when the timer is reset. You can reset, enable, or disable the timer, but you cannot change the timer value.

The default setting set by the factory is Enabled. Available options are Reset, Enabled, and Disabled. Resetting the timer also enables it. Selecting Enabled enables and resets the alarm if it was disabled. Selecting Disabled disables the alarm.

To change the setting for the chart paper timer

1. Access the CONFIGURATION screen.
   - **a** From the HOME screen, press the MAIN button. The MAIN screen appears.
   - **b** Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   - **c** Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2. From the CONFIGURATION screen, use the buttons to navigate to and select the System Options option. The SYSTEM OPTIONS screen appears with the Language setting highlighted.
3. Press the DOWN button until the Chart Paper Timer setting is highlighted.
4. Press the INC or DEC button until the new setting that you want to use appears.
5. Do one of the following to save the setting:
   - ► If you selected Enabled or Disabled: Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen. The setting is saved.
   - ► If you selected Reset:
     - **a** Press the DOWN button. The CHART RECORDER PAPER screen appears.
     - **b** Press one of the PAPER-CHANGED buttons (either the third or fourth button from the left). The SYSTEM OPTIONS screen appears with Chart Paper Timer set to Enabled.
     - **c** Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen. The setting is saved.

4.5 Enabling and disabling the temperature graph

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, "Changing the password."

The monitoring system has a real-time temperature graph which displays the readings of the upper temperature probe for the past 24 hours of operation. This graph appears on the bottom of the HOME screen whenever the buttons have not been pressed for one minute, and there are no active alarms. The graph clears if a button is pressed or an alarm activates.

You can control whether the graph appears. The default setting set by the factory is Enabled. Available options are Enabled and Disabled.

For more information about the temperature graph, see Section 6.2.5, "Understanding the temperature graph and when it appears."

To change the setting for the temperature graph

1 Access the CONFIGURATION screen.
   a From the HOME screen, press the MAIN button. The MAIN screen appears.
   b Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   c Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2 From the CONFIGURATION screen, use the buttons to navigate to and select the System Options option. The SYSTEM OPTIONS screen appears with the Language setting highlighted.
3 Press the DOWN button until the Temperature Graph setting is highlighted.
4 Press the INC or DEC button until the new setting that you want to use appears.
5 Press BACK to return to the previous screen, or press HOME to return to the HOME screen. The setting is saved.

4.6 Changing the password

NOTE: A password is needed to complete this task.

You can change the password to prevent unauthorized changes to the settings. A password is not needed to access other functions. The factory default password is 1234.

The password must have four digits. Each digit must be a number from 1 to 5. Your new password can be the same as one used previously.

To change the password

1 Access the CONFIGURATION screen.
   a From the HOME screen, press the MAIN button. The MAIN screen appears.
   b Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   c Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2 From the CONFIGURATION screen, use the buttons to navigate to and select the Change Password option. You are prompted to enter a new password.
3 Using the buttons, enter your new password. You are prompted to enter your new password again.
4 Using the buttons, enter your new password again. One of the following occurs:
   ► If the new password entries match, a message appears which states that your password has been updated. After a brief pause, you are returned to the CONFIGURATION screen.
   ► If the password entries do not match, the password is not changed. After a brief pause, during which you are told that the password is incorrect, you are returned to the CONFIGURATION screen. To change your password, you must repeat this procedure.

4.7 Restoring factory defaults

NOTE: A password is needed to complete this task. For more information about the password, see Section 4.6, "Changing the password."

You can change all the following settings at once to the default values set by the factory:

This setting	Is restored to this value
High Alarm Setpoint	24.0 °C
Low Alarm Setpoint	20.0 °C
Cond. Alarm Setpoint	50.0 °C
Door Ajar Timeout	3 minutes
Power Failure Timeout	3 minutes
Chart Paper Timer	6.5 days
Agitator 1 Setpoint	ON, 3 minutes
Agitator 2 Setpoint	ON, 3 minutes
Agitator 3 Setpoint	ON, 3 minutes

To restore factory default settings

1. Access the CONFIGURATION screen.
   - **a** From the HOME screen, press the MAIN button. The MAIN screen appears.
   - **b** Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
   - **c** Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
2. From the CONFIGURATION screen, use the buttons to navigate to and select the Factory Default Settings option. The FACTORY DEFAULT SETTINGS screen appears.
3. Do one of the following:
   - ► If you want to change the settings to the factory defaults, press the ENTER button. You are returned to the CONFIGURATION screen. Your settings are saved.
   - ► If you do not want to save the new value, press the BACK or HOME button to exit the FACTORY DEFAULT SETTINGS screen.

5 Preparing the alarm system on Horizon Series incubators

NOTE: This section only applies to Horizon Series models.

This section explains how to use the temperature controller to view and change alarm setpoints. It also explains how to locate and set controls for delaying alarms and changing the volume of audible alarms.

5.1 Viewing and changing the setpoints for temperature alarms

The monitoring and control system has alarms which activate if the temperature is too high or too low. You can view and change the setpoints for these alarms using the temperature controller. The temperature controller is located behind the control door on the front of the incubator.

Temperature controller display and buttons

The High Temperature alarm setpoint (AL.HI) specifies the temperature at which the High Temperature Alarm should activate. If the temperature that is detected by the chamber probe is greater than or equal to this value, the alarm activates. The default setpoint set by the factory is 24.0 °C.

The Low Temperature alarm setpoint (AL.LO) specifies the temperature at which the Low Temperature Alarm should activate. If the temperature that is detected by the chamber probe is less than or equal to this value, the alarm activates. The default setpoint set by the factory is 20.0 °C.

To view or change the setpoints for temperature alarms

NOTE: When there is no interaction for one minute, the temperature controller exits program mode and returns to normal mode.

1. On the temperature controller, enter Level 1 program mode by pressing and holding the Up and Down arrow buttons simultaneously for about three seconds until tunE and oFF flash on the display.
2. Press and release the Up or Down arrow button until the parameter that you want to view or change flashes on the display.
   - ► For the High Temperature setting, select the AL.HI parameter.
   - ► For the Low Temperature setting, select the AL.LO parameter.
3. To change the value: While holding the button on the left (*), use the Up and Down arrow buttons to adjust the value in increments of 0.1 °C.
4. When you are done adjusting the value, release all the buttons. The value is changed.
5. Exit Level 1 program mode by pressing and holding the Up and Down arrow buttons simultaneously for about three seconds until the current chamber temperature appears on the display.

5.2 Delaying when alarms are communicated

You can control how much time elapses between when certain alarm events occur and when the alarms are communicated. The amount of time, which is called the delay period, is set through the alarm delay control. PC4200h models, which have a built-in agitator, have a additional alarm delay control for the motion alarm.

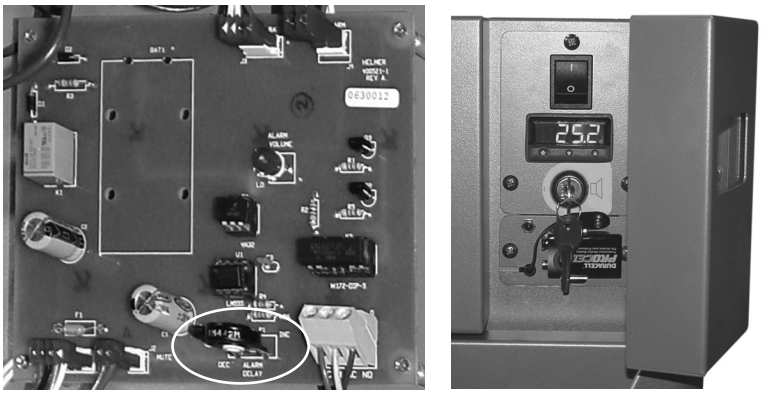
NOTE: The power failure alarm cannot be delayed.

5.2.1 Delaying temperature alarms

CAUTION: Changing the delay period for temperature alarms requires that you turn off the power to the incubator, which may affect the chamber temperature. Before changing the delay period, take precautions to protect items in the incubator from extended exposure to adverse temperatures.

You can control how much time elapses between when the temperature reaches the high or low alarm setpoints, and when the appropriate alarm is communicated.

The alarm delay control for temperature alarms is located on top of the incubator under the access panel.



Left: Alarm delay control for temperature alarms (circled). Right: Backup battery for the power failure alarm and key switch (PC100h model shown).

The delay period that you set with this control is used for both the high and low temperature alarms. The delay period can be set to a value between 0 and 8 minutes. At the factory, the delay period is set at the halfway point (approximately 4 to 5 minutes). Acceptable tolerance is as established by your organization.

This delay period is also used to set the time for muting the audible high and low temperature alarms. If the delay period is set to 0 minutes, the mute button will have no effect. For more information about muting alarms, see Section 6.4.2, “Muting audible alarms on Horizon Series models.”

You must have the following to change the delay period:

► Small flat-head screwdriver

To change the delay period for the temperature alarms

WARNING: Changing the delay period for temperature alarms requires that you remove the access panel from the incubator, which exposes you to the risk of electric shock. Regulations for your organization may require that only designated service personnel remove the access panel. Follow the guidelines for your organization.

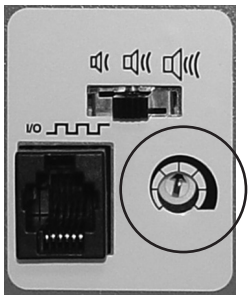
1. Disconnect the leads from the backup battery for the power failure alarm. This will disable the power failure alarm while you adjust the delay period.
2. Turn off the incubator and disconnect it from AC power.
3. On top of the incubator, remove the access panel and locate the alarm delay control on the alarm board.
4. Using the screwdriver, turn the alarm delay control counter-clockwise until it stops. This decreases the delay period to 0 minutes.
5. Using the screwdriver, increase the delay period by turning the alarm delay control clockwise to the appropriate position. Turning the control clockwise until it stops will set the delay period to approximately 8 minutes.
6. Connect the leads to the backup battery for the power failure alarm. This will enable the power failure alarm.
7. Install the access panel on the incubator, and connect to AC power.

5.2.2 Delaying the motion alarm

NOTE: This section only applies to PC4200h models, which have a built-in agitator.

You can control how much time elapses between when the built-in agitator stops agitating and when the alarm is communicated.

The alarm delay control for the motion alarm is located on the rear of the incubator. For more information, see Section 2.3.1, “Touring the alarm output area.”



Alarm delay control for the motion alarm (circled)

The delay period can be set to a value between 0 and 8 minutes. At the factory, the delay period is set at the halfway point (approximately 4 to 5 minutes). Acceptable tolerance is as established by your organization.

You must have the following to change the delay period:

► Small flat-head screwdriver

To change the delay period for the motion alarm

NOTE: Avoid leaving the delay period set to 0 minutes. If set to 0 minutes, an alarm will activate immediately whenever the incubator is turned on.

1. On the front of the incubator, enable the audible motion alarm by turning the key switch to Position 1.

2 Using the screwdriver, turn the alarm delay control counter-clockwise until it stops. This decreases the delay period to 0 minutes. The motion alarm should activate immediately.

3 Using the screwdriver, increase the delay period by turning the alarm delay control clockwise to the appropriate position. Turning the control clockwise until it stops will set the delay period to approximately 8 minutes.

5.3 Changing the volume for audible alarms

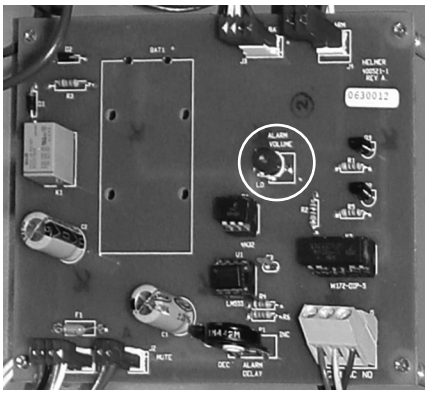
You can control the volume for audible alarms. The volume for temperature and power failure alarms is set through the alarm volume control. PC4200h models have an additional alarm volume control for the motion alarm.

5.3.1 Changing the volume for the temperature and power failure alarms

CAUTION: Changing the volume for the temperature and power failure alarms requires that you turn off the power to the incubator, which may affect the chamber temperature. Before changing the volume, take precautions to protect items in the incubator from extended exposure to adverse temperatures.

You can control the volume for the audible alarms for high temperature, low temperature, and power failure.

The alarm volume control for temperature and power failure alarms is located on top of the incubator under the access panel.



Left: Alarm volume control for temperature and power failure alarms (circled).

The volume that you set with this control is used for all three alarms. At the factory, the volume is set at the halfway point (medium).

You must have the following to change the volume:

► Small flat-head screwdriver

To change the volume for audible temperature and power failure alarms

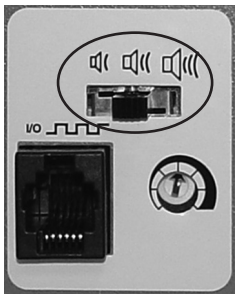
WARNING: Changing the volume for the temperature and power failure alarms requires that you remove the access panel from the incubator, which exposes you to the risk of electric shock. Regulations for your organization may require that only designated service personnel remove the access panel. Follow the guidelines for your organization.

1. Turn off the incubator and disconnect it from AC power. The power failure alarm will sound.
2. On top of the incubator, remove the access panel and locate the alarm volume control on the alarm board.
3. Using the screwdriver, increase or decrease the volume by turning the alarm volume control clockwise to the appropriate position. At the lowest setting, the alarm is very faint but still audible.
4. Install the access panel on the incubator, and connect to AC power.

5.3.2 Changing the volume for the motion alarm

NOTE: This section only applies to PC4200h models, which have a built-in agitator.

You can control the volume for the audible motion alarm through the alarm volume control. The alarm volume control for the motion alarm is located on the rear of the incubator. For more information, see Section 2.3.1, “Touring the alarm output area.”



Alarm volume control for the motion alarm (circled)

The audible motion alarm has three volume settings. At the factory, the volume is set to the middle setting.

To change the volume for the audible alarm

► Slide the alarm volume control to the appropriate position for the desired volume level.

6 Using the incubator

This section explains how to use the basic features of the incubator. It also explains how to identify when the incubator is operating normally and when it is in an alarm condition. In addition, this section explains how to mute audible alarms and identify when the chart paper needs to be changed.

6.1 Understanding how opening the door affects operation

The main power switch controls whether the incubator receives power. The door switch on the incubator controls whether certain components receive AC power when the door is open:

- **Interior outlets** (models without built-in agitators). When you turn on AC power, power is supplied to the outlets for use by agitators installed in the incubator. Power to the outlets is stopped (thereby stopping agitation) when you open the door, and resumed when you close the door.
- **Built-in agitator** (PC4200 models). When you turn on AC power, the agitator starts moving. It stops when you open the door and resumes when you close the door.

You can also bypass the door switch. While the door switch is bypassed, the incubator continues to operate as though the door is closed, and the door open alarm is bypassed.

To bypass the door switch

WARNING: Bypassing the door switch overrides safety features of the incubator that prevent injury from contact with moving parts. Use caution when bypassing the door switch.

1. Open the door. Agitation will stop.
2. On the door switch, pull the cylinder part out. Agitation will resume. The door switch is bypassed.

To activate the door switch

- Close the door. The door will push the cylinder part back to its normal position. The incubator is returned to normal operation.

6.2 Understanding visual alarms and messages

This section explains visual alarms and messages that may appear on the incubator.

NOTE: For a list of all visual alarms, see Section 9.2, “Alarm reference.”

6.2.1 Determining when the chamber heater is running

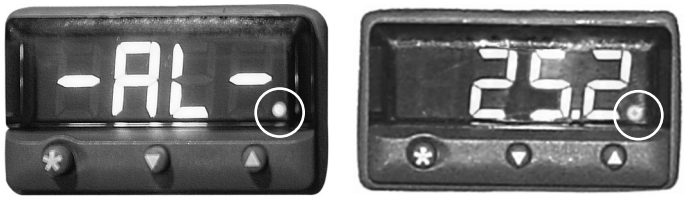
Whenever the chamber heater is running, a green light appears in the top left corner of the temperature controller. When the light is flashing, the heater is pulsing on and off to provide a small amount of heat.

Temperature controller with the chamber heater light circled

6.2.2 Identifying active alarms on Horizon Series models

NOTE: This section only applies to Horizon Series models.

If the temperature reaches either the high or low temperature setpoint, the display on the temperature controller alternates between -AL - and the temperature reading. The red light in the bottom right corner of display also flashes.



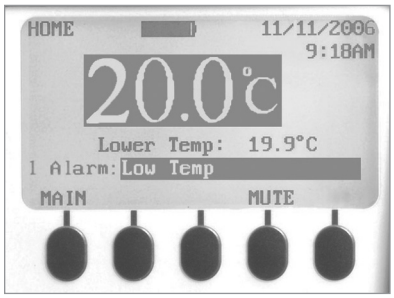
Temperature controller with a high temperature alarm. The alarm light is circled.

6.2.3 Identifying active alarms on i.Series models

NOTE: This section only applies to i.Series models.

On the HOME screen, you can view the number and type of alarms that are active. If any alarms are active, this area of the screen is highlighted and flashes.

If the alarm is for the chamber temperature, the upper chamber temperature is also highlighted and flashes.



HOME screen with an active Low Temperature alarm (sample)

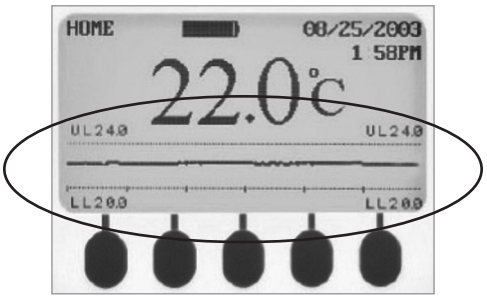
6.2.4 Understanding when the HOME screen appears

NOTE: This section only applies to i.Series models.

The monitoring system displays the HOME screen if the HOME button is pressed from any other screen. If another screen is displayed, and there is no interaction for two minutes, the monitoring system returns to the HOME screen. The only exceptions are the screens used to enter a password.

6.2.5 Understanding the temperature graph and when it appears

NOTE: This section only applies to i.Series models. For instructions to enable or disable the temperature graph, see Section 4.5, “Enabling and disabling the temperature graph.”



HOME screen with temperature graph (circled)

While there is power to the monitoring system, temperature data from the upper temperature probe is collected real-time, and the past 24 hours of collected data is stored. The temperature graph displays the temperature data for the past 24 hours of operation.

When this feature is enabled, this graph appears on the bottom of the MAIN screen whenever the buttons have not been pressed for one minute, and there are no active alarms. The graph clears if a button is pressed or an alarm activates.

The vertical axis represents the temperature, while the horizontal axis represents time.

The screen displays the previous 24 hours of readings from the upper temperature probe. The current temperature always appears on the right side of the screen. Each four hour period is separated by a vertical line. As time progresses, the display changes so the most current reading is always on the right.

The horizontal line at the top of the graph indicates the High Alarm setpoint, while the line at the bottom indicates the Low Alarm setpoint. If the temperature goes outside the limits, that section of the graph flashes.

If the AC power fails, the monitor continues to collect and display temperature data on the graph so long as there is backup power. If the AC power is restored before the backup power fails, there is no interruption in data collection: the temperature that is displayed on the graph for eight hours earlier was the temperature eight hours ago.

If the backup power fails, the monitor stops displaying temperature data and stops collecting new temperature data. However, the past 24 hours of data are retained. When the power is restored, the stored data is displayed, and the monitor resumes collecting and displaying real-time temperature data. In this case, there is an interruption in data collection: the temperature that is displayed on the graph for eight hours earlier was actually the temperature at eight hours before the backup power failed.

6.2.6 Understanding the agitator maintenance reminder and when it appears

NOTE: This section only applies to i.Series models.

The monitoring system displays a message upon sensing that an agitator has run for a certain length of time (approximately 3 years, assuming continuous operation). This message is a reminder to replace the wheels on the agitator.

Whenever you replace an agitator, or replace the wheels on an agitator, be sure to reset the cycle counter so that the reminder displays at the correct time. For instructions to reset the cycle counter, see Section 7.5.1, "Resetting agitator cycle counters on i.Series models."

To replace wheels, contact a qualified service technician.

6.3 Changing the chart paper

One piece of chart paper records temperatures continuously for seven days.

For i.Series models, the monitoring system has a visual indicator for the status of the chart paper. You can view the number of chart days remaining, and when paper needs to be changed, the Change chart paper alarm flashes on the HOME screen. Reset the alarm to acknowledge it, change the paper, then reset the alarm again. For instructions to view the number of days remaining, see Section 4.2, "Viewing current settings." For instructions to reset the alarm, see Section 4.4.5, "Changing the setting for the chart paper timer."

To access the chart recorder, pull open the chart recorder door.

For more information and instructions to change the chart paper, refer to the Chart Recorder Operation Manual for your incubator.

6.4 Controlling the sound for audible alarms

You can mute audible alarms. On Horizon Series models, you can also enable and disable audible alarms.

6.4.1 Muting audible alarms on i.Series models

You can set a timer that mutes all active audible alarms for a time period of your choosing.

When you mute alarms, only active alarms are muted. Any new alarms that activate during the mute period are audible. You must reset the mute timer each time a new alarm activates.

When all the muted active alarms clear because the alarm condition is no longer met, the mute timer clears as well. Any new alarms that activate after the timer clears are audible.

The factory default is to have the sound enabled for all audible alarms. Available timer settings are from 5 to 60 minutes, inclusive, in intervals of five minutes.

Muting an active audible alarm does not clear the visual alarm; however, it does clear the signal sent through the remote alarm interface. If the alarm is still active after the mute timer clears, the signal is sent again.

To mute audible alarms

1. From the HOME screen, press the MUTE button once to mute the alarm for five minutes. The MUTE button label changes to MUTE05, indicating that 5 minutes remain on the timer.
2. For each additional five minutes you want to mute the alarm, press the MUTE button again. The timer duration is changed, and the MUTE button label shows the new time.

6.4.2 Muting audible alarms on Horizon Series models

NOTE: This section only applies to Horizon Series models.

You can temporarily mute active audible alarms for high and low temperature conditions. The mute time is equal to the alarm delay period. For more information about the alarm delay period, see Section 5.2.1, "Delaying temperature alarms."

Muting audible alarms does not disable the visual alarm or signals sent through the remote alarm interface.

Mute button (circled) shown on a PC100h model.

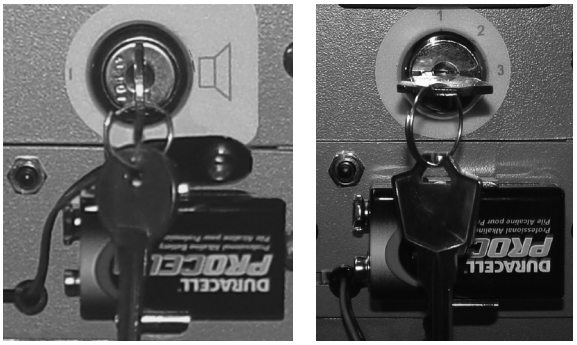
To mute an active audible alarm

► Open the control door and press the mute button. The alarm is muted for the preset alarm delay period. If the alarm is still active after the delay period has elapsed, the audible alarm is resumed.

6.4.3 Enabling and disabling audible alarms on Horizon Series models

NOTE: This section only applies to Horizon Series models.

You can enable or disable the sound for audible alarms by using the key switch. Disabling the sound does not disable alarm messages or lights on the temperature controller or the signals that are sent through the remote alarm interface. Keys are shipped from the factory either in the accessories box or in the key switch.



Left: Key switch shown on a PC100h model. Right: Key switch on PC4200h models.

To enable the sound for all audible alarms

► (PC4200h models) Using the alarm key, turn the key switch to Position 1.

► (All other Horizon models) Using the alarm key, turn the key switch to the On (|) position.

To disable the sound for all audible alarms

► (PC4200h models) Using the alarm key, turn the key switch to Position 3.
► (All other Horizon models) Using the alarm key, turn the key switch to the Off (○) position.

To disable the sound for only the motion alarm (PC4200h models only)

► Using the alarm key, turn the key switch to Position 2.

6.5 Adjusting the screen contrast

NOTE: This section only applies to i.Series models.

You can adjust the contrast between the text and the background.

To adjust the screen contrast

► From the HOME screen, do one of the following:
  ► To decrease the contrast one level, press the center button. The text appears lighter.
  ► To increase the contrast one level, press the second button from the left. The text appears darker.

NOTE: If a power failure alarm is active, the screen backlight is not illuminated to conserve the charge for the backup batteries. During a power failure, pressing the contrast buttons does not affect the contrast.

6.6 Rolling out shelves

The PC2200 and PC3200 models have roll-out shelves to provide easier access to agitators.

WARNING: On PC3200 models, do not roll out more than one shelf at a time if they have agitators on them. Having more than one shelf open at a time may cause the incubator to roll forward and cause injury.

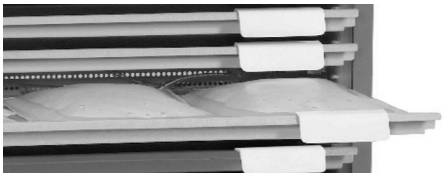
6.7 Storing items in the built-in agitator

NOTE: This section only applies to PC4200 models, which have a built-in agitator. For information about loading platelet bags in a Helmer agitator that is installed in the incubator, refer to the Flatbed Platelet Agitator Operation Manual for your agitator.

WARNING: Follow all chemical handling and disposal requirements and procedures specified by your organization. For more information, see Section 1, “Working safely.”

Before storing items in the incubator, be sure that the temperature is correct and stable. If you are using the incubator for the first time, or after a power failure that causes the chamber to reach room temperature, let the incubator stabilize at the setpoint temperature before storing items in it. Stabilization may take as long as 30 minutes.

6.7.1 Loading platelet bags in the built-in agitator



PC4200 model agitator with platelet bags. Label holders are installed on the drawers.

The platelet bag capacity for the built-in agitator is 396 random bags or 132 apheresis bags.

To load platelet bags

CAUTION: When opening drawers:

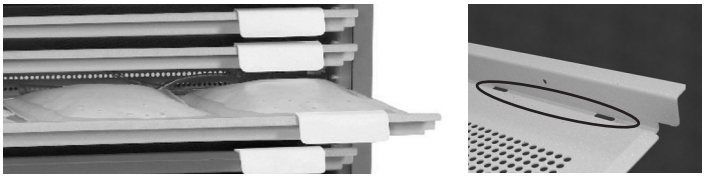
- ► Do not pull out more than one drawer at a time. Having more than one drawer open at a time may cause the agitator to roll forward and cause injury.
- ► Do not use the label holder to pull out the drawer. The holder may break away from the handle after repeated use. Grasp the drawer handle instead.

1. Open the drawer that you want to load. Grasp the center of the drawer handle and pull out the drawer, lifting lightly as you pull. If a drawer is difficult to open, gently push it closed and try again, making sure that you are pulling the drawer straight out.
2. Lay the platelet bags flat on the drawer, according to the following guidelines, as well as any other guidelines for your organization:
   - ► Avoid stacking bags. Stacked bags may slide off the drawer during agitation.
   - ► Maintain enough space around each bag for adequate air circulation. For thicker bags, you can remove drawers to provide extra space.
   - ► Place the tubing neatly under or around the bag so that it does not obstruct movement of the agitator drawers or storage frame.

6.7.2 Identifying the contents of the agitator drawers

You can identify the contents of each drawer using the label holders that are supplied with the incubator. Create your own magnetic or adhesive labels and apply them to the label holders. Label holders, as well as the hardware and tool to install them, are shipped from the factory in the accessories box. Contact Helmer or your local distributor to order additional holders.

Each drawer has three sets of slots so you can install the holder on the left side, the right side, or the center.

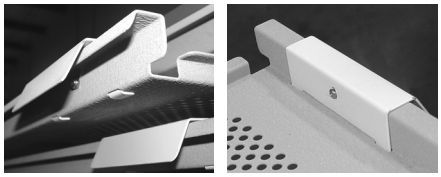


Left: Drawers with label holders installed. Right: Slots on a drawer (circled)

You can also identify drawer contents by replacing the standard drawer with one of a different color. Contact Helmer or your local distributor for more information about drawer availability. For instructions to replace a drawer, see Section 7.4.1, “Maintaining drawers.”

To install a label holder on a drawer

1. Insert the tabs on the holder into a set of slots on the drawer.
2. Pivot the holder around the drawer handle until the holes on the holder and the drawer are aligned.
3. Starting from the front of the drawer, insert a screw though the holes in the holder and drawer.
4. Using the tool provided with the holder, tighten the nut onto the screw until the holder is secure.



Detail of a label holder installed on the drawer handle

6.8 Locking the doors

You can lock the door or doors to prevent unauthorized access to items stored in the incubator. The incubator is shipped from the factory with two keys.

6.9 Viewing real-time information

NOTE: This section only applies to i.Series models.

With the i.Center monitoring system, you can view the status of the incubator. The most important information is displayed on the HOME screen, but additional information is available from other screens.

6.9.1 Viewing real-time agitation information

NOTE: This section only applies to i.Series models.

For each i.Series agitator that is installed in the incubator, or the built-in agitator, you can view the current agitation speed in real-time. You may need this information if your organization requires you to periodically confirm that the speed is within a particular tolerance.

You can also view the counter that tracks the number of cycles that have been completed. This information is useful for troubleshooting problems with the motion sensor, or for scheduling additional preventive maintenance items for the agitator as required by your organization.

To view the current agitation speed

1. Access the AGITATOR INFORMATION screen.
   a. From the HOME screen, press the MAIN button. The MAIN screen appears.
   b. From the MAIN screen, use the buttons to navigate to and select the i.Help option. The AGITATOR INFORMATION screen appears with the first option highlighted.
2. Press the Down button until Agitator RPM is highlighted, then press the Select button. The AGITATOR RPM screen appears with the current speed for each agitator.
3. Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen.

To view real-time agitator cycle counts

1 Access the AGITATOR INFORMATION screen.
   a From the HOME screen, press the MAIN button. The MAIN screen appears.
   b From the MAIN screen, use the buttons to navigate to and select the i.Help option. The AGITATOR INFORMATION screen appears with the first option highlighted.
2 Do one of the following to display the AGITATOR TOTAL CYCLE COUNT screen, on which the current cycle count for each agitator appears in units of thousands:
   ► Press the Down button until Agitator RPM is highlighted, then press the Select button. The AGITATOR RPM screen appears with the current speed for each agitator. Press the Cycles button.
   ► Press the Down button until Agitator Cycles is highlighted, then press the Select button.
3 Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen.

6.9.2 Viewing the chart paper status

You can view the number of days remaining before the chart paper needs to be changed.

To view the chart paper status

► From the MAIN screen, use the buttons to navigate to and select the System Alarm Test & Status option. The SYSTEM ALARM TEST & STATUS screen appears, showing the number of days remaining (if the chart paper timer is enabled) or the status of the time (if disabled).

6.9.3 Viewing the door status

You can view whether the i.Center monitoring system detects that a door is open.

To view the door status

► From the MAIN screen, use the buttons to navigate to and select the System Alarm Test & Status option. The SYSTEM ALARM TEST & STATUS screen appears, showing the door status (OPEN or CLOSED).

6.9.4 Viewing the condenser temperature

You can view the temperature of the condenser discharge line. This may be useful for troubleshooting.

To view the condenser temperature

► From the MAIN screen, use the buttons to navigate to and select the System Alarm Test & Status option. The SYSTEM ALARM TEST & STATUS screen appears, showing the condenser temperature.

6.10 Viewing historical information

NOTE: This section only applies to i.Series models.

The i.Center monitoring system has an event log that displays information about the previous fifty alarm events. It also displays the number of door openings for the current and previous day.

It also has an event log that displays information about when the agitator cycle counters were reset.

6.10.1 Viewing the event log

The EVENT LOG screen displays information about the previous fifty alarm events. It also displays the number of door openings for the current and previous day.

To view the event log

► From the MAIN screen, use the buttons to navigate to and select the Event Log option. The EVENT LOG screen appears.

6.10.1.1 Understanding the event log format

The following is the format for the event log:

```
EVENT LOG  Door    AA/AA BB/BB
           Openings:   C     D
EE F GG HH/HH/HH II:IIJ KK.KK°L
```

Item	Description
AA/AA	Current date (month and day)
BB/BB	Previous date (month and day)
C	Number of door openings on current date
D	Number of door openings on previous date
EE	Event number. The most recent event is numbered as 1. Values can be 1-50, inclusive.
F	Event. S indicates the start of an alarm condition. R indicates that the alarm was reset and the system returned to normal.
GG	Alarm Type. Alarm types are as follows: DR Door Open HI High temperature LO Low temperature CO Condenser temperature NB No Battery AC Power failure A(n) Agitator (n) stopped (where n is 1, 2, or 3, depending on model)
HH/HH/HH	Date of event (month and day, and the last two digits of the year)
II:II	Time (hours and minutes) of event.
J	Time (appears for 12-hour format only). A indicates AM, and P indicates PM.
KK.KK	Upper chamber temperature at time of event.
L	Temperature measurement system. C indicates Celsius, F indicates Fahrenheit.

6.10.1.2 Viewing details about an event

You can view additional details about events that appear in the event log.

To view details about an event

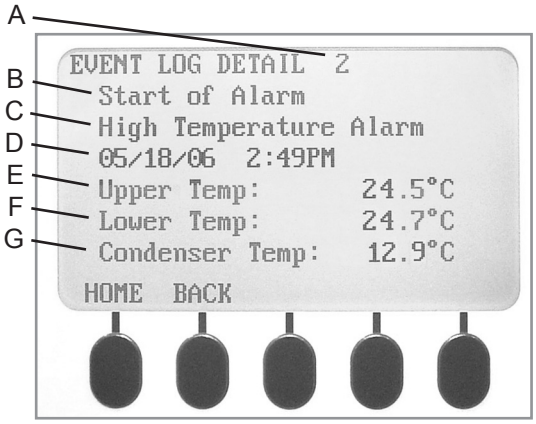
1 From the EVENT LOG screen, press the UP or DOWN button until the event number for which you want details is highlighted.

NOTE: If the entire line for the event is highlighted, then the alarm for that event was caused by a system self-test that was initiated by an operator.

2 Press the SELECT button. The EVENT LOG DETAIL screen for that event number appears.

3 Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen.

6.10.1.3 Touring the EVENT LOG DETAIL screen



EVENT LOG DETAIL screen (sample)

Label	Description
A	Event number
B	Event
C	Alarm Type
D	Date and time of event
E	Upper chamber temperature at time of event
F	Lower chamber temperature at time of event (Available on PC3200i and PC4200i models only)
G	Condenser discharge line temperature at time of event

6.10.2 Viewing the agitator count log

The i.Center monitoring system has three logs that show information about the cycle counter for each agitator. Each time a cycle counter is reset for a particular agitator, an event is recorded in the agitator count log for that agitator. The agitator count log displays the date, time, and cycle count for the previous fifty reset events.

To view the agitator count log for an agitator

1. Access the AGITATOR INFORMATION screen.
   - **a** From the HOME screen, press the MAIN button. The MAIN screen appears.
   - **b** From the MAIN screen, use the buttons to navigate to and select the i.Help option.
   - **c** From the i.Help screen, use the buttons to navigate to and select the Agitator Information option. The AGITATOR INFORMATION screen appears with the first option highlighted.
2. Press the Down button until Agitator Count Logs is highlighted, then press the Select button. The AGITATOR COUNT LOGS screen appears with the first agitator highlighted.
3. Press the Up or Down button until the log that you want to view is highlighted, then press the Enter button. The count log screen appears for the agitator you selected.
4. (Optional) To view older events in the log, press the DOWN arrow until they appear. Press the UP arrow to move up to the most recent event.
5. Press the BACK button to return to the previous screen, or press the HOME button to return to the HOME screen.

6.10.2.1 Understanding the agitator count log format

The following is the format for the event log:

```
Total Counts       AAAAAAAAA
BB CC/CC/CC DD:DDE FFFFFFFFF
```

Item	Description
AAAAAAAAA	Total cycles counted for the selected counter
BB	Reset event number. The most recent event is numbered as 1. Values can be 1-50, inclusive.
CC/CC/CC	Date of event (month and day, and the last two digits of the year)
DD:DD	Time (hours and minutes) of event.
E	Time (appears for 12-hour format only). A indicates AM, and P indicates PM.
FFFFFFFFF	Cycles counted since the last reset event.

6.11 Getting help

NOTE: This section only applies to i.Series models.

Some of the information in this manual also appears in the on-board help system: i.Help.

To access i.Help

1. From the MAIN screen, use the buttons to navigate to and select the i.Help option. The i.Help screen appears.
2. Using the buttons, highlight and select the topic for which you want more information.
3. Follow the on-screen instructions and use the buttons to view additional information.
4. When you are done, press the HOME button to return to the HOME screen.

NOTE: The level of detail that appears in i.Help may differ slightly from the contents of this manual.

7 Maintaining the incubator

This section includes the recommended preventive maintenance schedule and procedures for completing maintenance tasks.

7.1 Reviewing the preventive maintenance schedule

Maintenance tasks must be completed according to the following schedule.

NOTE: These are minimum requirements. Regulations for your organization or physical conditions at your organization may require maintenance items to be performed more frequently, or only by designated service personnel. Follow the guidelines for your organization.

Task	Frequency		
	Quarterly	Annually	As needed
(i.Series models only) Check for active battery alarms. If an alarm is present, or if the batteries have been in use for one year, replace the backup batteries for the monitoring system. ► For more information and instructions, see Section 7.2.1, “Checking and replacing batteries for the monitoring system.”			✓
(Horizon Series models only) Test the backup battery for the power failure alarm. If the test fails, or the battery has been in use for one year, replace it. ► For more information and instructions, see Section 7.2.2, “Testing and replacing the battery for the power failure alarm.”	✓		
(PC4200 models only) Replace the battery for the motion alarm system. ► For more information and instructions, see Section 7.2.3, “Testing and replacing the battery for the motion alarm.”		✓	
(Models with chart recorders only) Check the backup battery for the chart recorder and change it if necessary. ► For more information and instructions, refer to the Chart Recorder Operation Manual.	✓		
Clean the condenser grill. ► For more information and instructions, see Section 7.3, “Cleaning the incubator.”	✓		
Clean the exterior. ► For more information and instructions, see Section 7.3, “Cleaning the incubator.”			✓
Clean the interior. ► For more information and instructions, see Section 7.3, “Cleaning the incubator.”			✓

Task	Frequency		
	Quarterly	Annually	As needed
(Floor models only) Clean the door gaskets. ► For more information and instructions, see Section 7.3, “Cleaning the incubator.”			✓
(PC4200 models only) Check moving parts for the agitator for cleanliness and wear. Lubricate moving parts. Replace parts if necessary or when prompted by the agitation maintenance reminder. ► For more information and instructions, see Section 7.4, “Maintaining moving parts on the built-in agitator.”		✓	
Check the temperature calibration for the temperature controller readout and change it if necessary. ► For more information and instructions, see Section 7.6, “Calibrating the temperature controller readout.”	✓		
(i.Series models only) Check the temperature calibration for the i.Center monitoring system readout and change it if necessary. ► For more information and instructions, see Section 7.7, “Calibrating temperature readings on the i.Center.”	✓		
Test the chamber temperature alarms. ► For more information and instructions, see Section 7.8, “Testing chamber temperature alarms.”	✓		
Test the power failure alarm. ► For more information and instructions, see Section 7.9, “Testing the power failure alarm.”	✓		
(i.Series models with installed agitators and PC4200h models only) Test the motion alarm. ► For more information and instructions, see Section 7.10, “Testing the motion alarm.”	✓		
(i.Series models only) Test the door open alarm. ► For more information and instructions, see Section 7.11, “Testing the door open alarm.”	✓		
(i.Series models only) Test the no battery alarm. ► For more information and instructions, see Section 7.12, “Testing the No Battery alarm.”	✓		

7.2 Testing and replacing batteries

WARNING:

- ► Follow all chemical handling and disposal requirements and procedures specified by your organization. For more information, see Section 1, "Working safely."
- ► Removing the access panel from the incubator exposes you to the risk of electric shock. Regulations for your organization may require that only designated service personnel remove the access panel. Follow the guidelines for your organization.

CAUTION: Testing and replacing the backup batteries may require that power be disconnected from the incubator, which may affect the chamber temperature. Before disconnecting the power, take precautions to protect items in the incubator from extended exposure to adverse temperatures.

For information about replacing the battery on the chart recorder, refer to the Chart Recorder Operation Manual.

7.2.1 Checking and replacing batteries for the i.Center monitoring system

NOTE: This section only applies to i.Series models.

The monitoring system for i.Series models has visual indicators for the status of the backup batteries. On the HOME screen, the Battery charge level displays information about the remaining life of the batteries. If the batteries deplete so that the remaining life is two hours or less, the Low Battery alarm flashes on the HOME screen. If the batteries are missing or close to completely depleted, the No Battery alarm flashes on the HOME screen. Replace the batteries when either of these alarms activate, or if the batteries have been in use for one year. The incubator uses six non-rechargeable 1.5 V D-cell alkaline (or equivalent) batteries.

To check for battery alarms

► On the monitoring system, on the HOME screen, check if either the Low Battery or No Battery alarm is flashing. If either alarm is present, replace the batteries.

To test the backup batteries

1. Disconnect the incubator from AC power. The display should continue to display information, although it may be harder to read. If the display is blank, replace the batteries.
2. Connect the incubator to AC power.

To replace the backup batteries

1. Turn off the incubator and disconnect it from AC power.
2. On the top of the incubator, remove the access panel to access the batteries.
3. Remove all six batteries and replace them with six fresh batteries. Avoid reusing any of them that may have some charge remaining.
4. Install the access panel.

7.2.2 Testing and replacing the battery for the power failure alarm

NOTE: This section only applies to Horizon Series models.

Regularly test whether the backup battery is functioning, and replace it if the test fails or if the battery has been in use for one year. The power failure alarm system uses one non-rechargeable 9 V alkaline (or equivalent) battery.

To test the backup battery

1. Disconnect the incubator from AC power. The power failure alarm should sound immediately. If it does not sound, replace the battery.
2. Connect the incubator to AC power.

To replace the backup battery

1. On the front of the incubator, open the control door to access the battery and key switch.
2. Disable the sound for the power failure alarm by doing one of the following:
   - ► (PC4200h models) Using the alarm key, turn the key switch to Position 3.
   - ► (All other Horizon models) Using the alarm key, turn the key switch to the Off (O) position.
3. Remove the leads from the battery and remove the battery.
4. Install a fresh battery and connect the leads.
5. Enable the sound for the power failure alarm by doing one of the following:
   - ► (PC4200h models) Using the alarm key, turn the key switch to Position 1 or 2.
   - ► (All other Horizon models) Using the alarm key, turn the key switch to the On (|) position.

7.2.3 Replacing the battery for the motion alarm

NOTE: This section only applies to PC4200 models, which have a built-in agitator.

Regularly test whether the backup battery is functioning, and replace it if the test fails or if the battery has been in use for one year. Replace the battery for the motion alarm with a rechargeable 9 V Nickel-Metal Hydride (NiMH) battery or its equivalent.

To test the backup battery

1. For i.Series models, do the following:
   - **a** Verify that the backup power for the i.Center is enabled and that the batteries have sufficient power. For more information, see Section 3.6.1, “Enabling backup power for the i.Center monitoring system” and Section 7.2.1, “Checking and replacing batteries for the i.Center monitoring system.”
   - **b** Identify the delay period for the motion alarm, which is the Agitator 1 Setpoint. For instructions, see Section 4.2, “Viewing current settings.”
2. For Horizon Series models, do the following:
   - **a** Disable the battery for the power failure alarm by disconnecting the leads. For more information, see Section 3.6.2, “Enabling backup power for the power failure alarm system.”
   - **b** Identify the delay period for the motion alarm, which is the setting on the rear of the incubator. For more information, see Section 5.2.2, “Delaying the motion alarm.”
3. With the incubator turned on and agitating, disconnect AC power from the incubator.
4. After the delay period has elapsed, the motion alarm should activate. If it does not activate, or the battery has been in use for one year, replace the battery.

To replace the backup battery

1. Turn off the incubator and disconnect it from AC power.
2. On the top of the incubator, remove the access panel to access the battery.
3. Remove the battery and replace it with a fresh battery.
4. Install the access panel.
5. Connect the incubator to AC power. The battery charges when AC power is turned on.

7.3 Cleaning the incubator

WARNING: Follow all chemical handling and disposal requirements and procedures specified by your organization. Use specific cleansers and cleaning supplies specified by your organization. For more information, see Section 1, “Working safely.”

7.3.1 Cleaning the condenser grill

The condenser grill must be kept clean to ensure proper operation. Not cleaning the condenser grill regularly can significantly reduce the life expectancy of the incubator.

In environments where the incubator is exposed to excessive lint or dust, the condenser grill may need to be cleaned more frequently than stated on the preventive maintenance schedule.

On countertop models, the condenser grill is located on the rear of the incubator. On floor models, the grill is located on the right side of the incubator. For more information, see Section 2, “Touring the incubator.”

WARNING: Disconnect power to the incubator to eliminate the potential of electric shock and injury from surrounding components.

CAUTION: Cleaning the condenser grill requires that you disconnect power to the incubator. Before disconnecting the power, take precautions to protect items in the incubator from extended exposure to adverse temperatures.

Clean the condenser grill using a soft brush and a vacuum cleaner.

7.3.2 Cleaning the exterior

Clean the exterior with a soft cotton cloth and a non-abrasive liquid cleaner. Clean glass surfaces with a soft cotton cloth and glass cleaner.

For PF4200 models, clean the vents in the base as needed to maintain airflow and prevent the motor from overheating.

7.3.3 Cleaning the interior

Clean stainless steel surfaces with a general-purpose laboratory cleaner suitable for stainless steel. Clean painted surfaces with mild detergent. Disinfect using a mild disinfectant solution.

For PC4200 models, clean the textured drawer surfaces with a soft brush. If you want to remove the drawers for cleaning, see Section 7.4.1, “Maintaining drawers,” for instructions.

7.3.4 Cleaning door gaskets

Clean door gaskets with a soft cloth and mild soap and water solution.

7.4 Maintaining moving parts on the built-in agitator

NOTE: This section only applies to PC4200 models, which have a built-in agitator.

The agitator has many moving parts that must be kept clean and lubricated for proper operation.

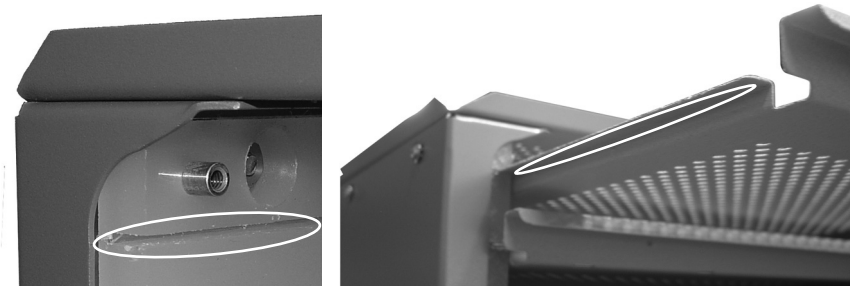
After extended periods of usage, some parts may become worn and require replacement. To replace parts, contact a qualified service technician.

7.4.1 Maintaining drawers

CAUTION: Follow these precautions when opening drawers:

- ► Do not pull out more than one drawer at a time. Having more than one drawer open at a time may cause the agitator to roll forward and cause injury.
- ► Do not use the label holder to pull out the drawer. The holder may break away from the handle after repeated use. Grasp the drawer handle instead.

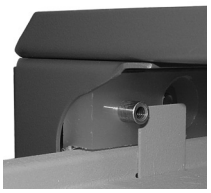
Keep the slots in the drawer guides free of debris. Lubricate the drawers as needed by applying a thin film of petroleum jelly underneath the sides of each drawer.



Left: Slot in drawer guide (circled). Right: Side of a drawer, with location to lubricate circled.

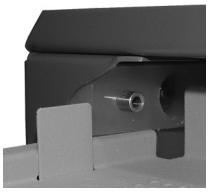
To remove a drawer

1 Grasp the center of the drawer handle and pull out the drawer until it stops, lifting lightly as you pull. If a drawer is difficult to open, gently push it closed and try again, making sure that you are pulling the drawer straight out. At the full open position, the tabs on each side of the drawer are right behind the spring-loaded stops on the drawer guides.



Drawer in the full open position

2 While pressing the stops, slide the drawer out until the tabs on the drawer are in front of the stops.



Drawer with left tab in front of the stop

3 Continue pulling the drawer out and remove it from the agitator storage frame.

To install a drawer

1 Align the sides of the drawer with the slots in the drawer guide, and push the drawer into the storage frame until it stops.

2 While pressing the spring-loaded stops, slide the drawer into the storage frame until the tabs on the drawer are behind the stops.

3 Gently push the drawer all the way into the storage frame until it stops.

7.4.2 Maintaining the drive shaft and motor

WARNING:

- ► Regulations for your organization may require that only designated service personnel access and maintain the drive shaft and motor. Follow the guidelines for your organization.
- ► Follow all chemical handling and disposal requirements and procedures specified by your organization. For more information, see Section 1, "Working safely."

The drive shaft and motor for the agitator are located inside the base. They should be checked periodically for cleanliness and wear. The drive shaft has two bearings. The bearing on the end connected to the drive plate must be lubricated.

You must have the following to access the drive shaft and motor and lubricate the bearing:

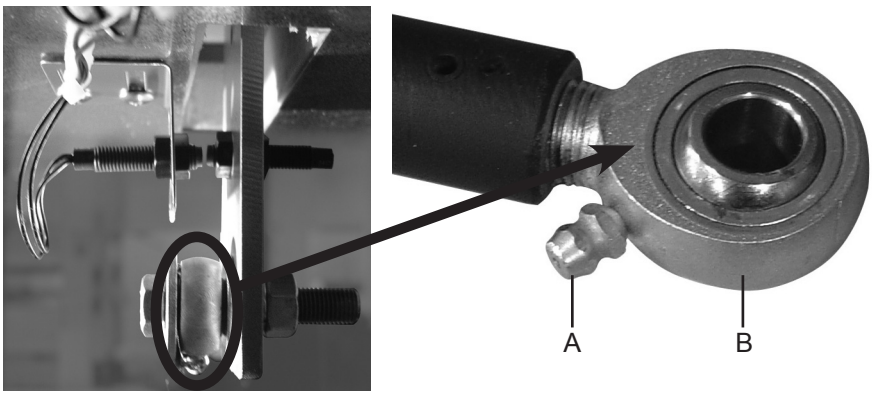
- ► #2 Phillips-head screwdriver
- ► Grease gun with bearing grease

To remove the side panels

1. Disable the power failure alarm by doing one of the following:
   - ► PC4200i models: turn the key switch to the Off (○) position.
   - ► PC4200h models: turn the key switch to Position 3.
2. Turn off the incubator and disconnect it from AC power.
3. Use the screwdriver to remove the screws that secure the side panels to the base.

To lubricate the bearing

- ► Inject bearing grease into the grease fitting on the bearing.



Left: Drive shaft (circled). Right: Detail of drive shaft.

Label	Description
A	Grease fitting
B	Bearing

To install the side panels

- ► Position the panels on the base, then install and tighten the screws to secure them to the base.

7.4.3 Maintaining the wheels

Check the four wheels on the agitator periodically for cleanliness and wear. Use a #2 Phillips-head screwdriver to remove the cover from the front wheels.

If the wheels need to be replaced, contact a qualified service technician.

7.5 Replacing an agitator

NOTE: This section does not apply to PC4200 models, which have a built-in agitator.

Use the following procedure to replace an agitator.

To replace an agitator in the incubator

1. Turn off the incubator and disconnect it from AC power.
2. Remove the agitator from the incubator.

CAUTION: On PC3200 models, do not roll out more than one shelf at a time if they have agitators on them. Having more than one shelf open at a time may cause the incubator to roll forward and cause injury.

   a. Disconnect the I/O connector (i.Series models only) and power cord from the inside of the incubator.
   b. To reduce the weight of the agitator, remove the drawers from the storage frame before lifting it. For instructions, refer to the Platelet Agitator Operation Manual.
   c. When lifting the agitator, hold the agitator on the ends rather than in the middle. Lifting from the middle may cause the frame to bow and affect operation. For more information, refer to the Platelet Agitator Operation Manual.
3. Install the new agitator. For information and instructions, see Section 3.10, “Setting up agitators in the incubator.”
4. If you are installing a Helmer i.Series agitator in an i.Series incubator, do the following:
   a. Confirm that the motion alarm settings are correct and change them if needed. For more information and instructions, see Section 4.4.3, “Changing the settings for motion alarms.”
   b. Reset the cycle counter for the agitator. For instructions, see Section 7.5.1, “Resetting agitator cycle counters on i.Series models.”

7.5.1 Resetting agitator cycle counters on i.Series models

When replacing an agitator that is installed in the incubator, reset the agitator cycle counter before using the agitator. Resetting the counter will ensure that the correct cycle count information is displayed for the new agitator, and that the agitator maintenance reminder appears at the proper time.

When you reset the counter, status information is recorded in the agitator count log for that agitator position. For more information about this log and instructions to view it, see Section 6.10.2, “Viewing the agitator count log.”

To reset an agitator cycle counter

1. Access the AGITATOR INFORMATION screen.
   a. From the HOME screen, press the MAIN button. The MAIN screen appears.
   b. From the MAIN screen, use the buttons to navigate to and select the i.Help option.
   c. From the i.Help screen, use the buttons to navigate to and select the Agitator Information option. The AGITATOR INFORMATION screen appears with the first option highlighted.
2. Press the Down button until Agitator Cycles is highlighted, then press the Select button. The AGITATOR TOTAL CYCLE COUNT screen appears with the first agitator highlighted.
3. Press the Down button until the counter that you want to reset is highlighted, then press the Enter button. The RESET AGITATOR screen appears.
4. Press the Enter button. The counter is reset.

7.6 Calibrating the temperature controller readout

NOTE: Refer to the policy for your organization to determine how much variance is acceptable. If the variance is within acceptable limits for your organization, you may not need to change the offset value.

To ensure that the high and low temperature alarms are activated properly, the chamber temperature that is read by the temperature control probe must be accurate.

The Monitor Offset is used to calibrate the displayed temperature with the measured temperature. If the temperature that is displayed on the monitor does not match the actual chamber temperature, as measured with an independent thermometer, you can change the setting for the Monitor Offset so that they match.

The default value varies for each incubator. The monitor offset can be changed to a value from -100 °C to +100 °C, inclusive. Values in increments of 0.1 °C can be selected within the range of -10.0 °C to +10.0 °C.

You must have the following to complete this procedure:

► Thermometer. The thermometer must be independent of the incubator, and be calibrated and traceable according to the policy of the National Institute of Standards and Technology (NIST), or to the equivalent national or international measuring equipment standards as identified in regulations for your organization.

To calibrate the temperature controller readout

1. Verify that the incubator has been placed properly, and allow it to run for at least 30 minutes to stabilize the chamber temperature. For more information, see Section 3.3, “Selecting an appropriate location.”
2. Measure the temperature of the chamber with the independent thermometer.
   a. Place the independent thermometer in the chamber in the appropriate location, as follows:

Model	Location
PC100	Front, top right corner
PC900, PC1200	Back, right bottom corner
PC2200, PC3200	Next to the temperature control probe
PC4200	In the middle drawer on the right side

   b. Allow the chamber temperature to stabilize. This may take as long as 30 minutes.
   c. Obtain the reading from the independent thermometer.
3. Determine how to adjust the offset value.
   a. Compare the reading from the thermometer to that on the monitor.
      ► Example 1 (monitor reading is too high): the monitor reading is 23.0 °C, and the thermometer reading is 22.5 °C
      ► Example 2 (monitor reading is too low): the monitor reading is 21.0 °C, and the thermometer reading is 22.0 °C
   b. Determine how much to increase or decrease the offset value to make the monitor reading match the thermometer reading.
      ► Example 1: decrease by 0.5 to match the thermometer reading.
      ► Example 2: increase by 1.0 to match the thermometer reading.
4. On the temperature controller, enter Level 3 program mode.
   a. On the temperature controller, enter Level 1 program mode by pressing and holding the Up and Down arrow buttons simultaneously for about three seconds until tunE and OFF flash on the display.
   b. Press and release the Up or Down arrow button until the LEUL parameter and its value flash on the display.
   c. While holding the button on the left (*), use the Up and Down arrow buttons to change the value to 3.
   d. Release all the buttons. LEUL and 3 flash on the display. The temperature controller is now is Level 3 program mode.

5 Select the Monitor offset parameter and adjust the value.
   a With the temperature controller in Level 3 program mode, press and release the Up or Down arrow button until the Zero parameter and its value flash on the display.
   b To change the value: While holding the button on the left (*), use the Up and Down arrow buttons to adjust the value in increments of 0.1 °C.
   c When you are done adjusting the value, release all the buttons. The value is changed.
6 Exit Level 3 program mode by pressing and holding the Up and Down arrow buttons simultaneously for about three seconds until the current chamber temperature appears on the display.
7 Allow the chamber temperature to stabilize, then verify that the readout is acceptable. Repeat the calibration process if necessary.
8 Remove the independent thermometer from the chamber.

7.7 Calibrating temperature readings on the i.Center

NOTE:
- ► This section only applies to i.Series models.
- ► Refer to the policy for your organization to determine how much variance is acceptable. If the variance is within acceptable limits for your organization, you may not need to change the probe settings.

To ensure that the temperature alarms are activated properly, the readings for the temperature monitoring probe must be accurate. The reading for the lower probe in PC3200i and PC4200i models should also be accurate. After determining the appropriate temperature from an independent thermometer, you can change the value displayed on the monitor for the temperature probes.

The default value set by the factory for each temperature probe is 22.0 °C. Although the temperature control range for the incubator is 20 °C to 35 °C, available values for calibration are from -40 °C to +40 °C, inclusive.

You must have the following to complete this procedure:

- ► Thermometer. The thermometer must be independent of the incubator, and be calibrated and traceable according to the policy of the National Institute of Standards and Technology (NIST), or to the equivalent national or international measuring equipment standards as identified in regulations for your organization.

To calibrate the readings

1 Verify that the incubator has been placed properly, and allow it to run for at least 30 minutes to stabilize the chamber temperature. For more information, see Section 3.3, “Selecting an appropriate location.”
2 Measure the temperature in the chamber.
   a Place the independent thermometer in the chamber in the appropriate location, as follows:

Model	Location
PC100	Front, top right corner
PC900, PC1200	Back, right bottom corner
PC2200	Next to the upper temperature probe
PC3200	Upper reading: next to the upper temperature monitoring probe Lower reading: next to the lower temperature monitoring probe
PC4200	Upper or lower reading: In the middle drawer on the right side

   b Allow the chamber temperature to stabilize. This can take as long as 30 minutes.
   c Obtain the reading from the independent thermometer.

3 Enter and save the reading from the independent thermometer.

- **a** From the HOME screen, press the MAIN button. The MAIN screen appears.
- **b** Use the buttons to navigate to and select the Edit Configuration option. You are prompted to enter your password.
- **c** Enter your password. If the password is correct, the CONFIGURATION screen appears with the first option highlighted.
- **d** From the CONFIGURATION screen, use the buttons to navigate to and select the Temperature Calibration option. The TEMPERATURE CALIBRATION screen appears.
- **e** Do one of the following:
  - ► For PC3200i and PC4200i models, which have two probes, Select Temp Probe is highlighted. Press the INC or DEC button to highlight and select the probe (Upper or Lower) for which you want to change the setting. Press the DOWN button until the Temperature option is highlighted. Next to Current temperature, the current chamber temperature as read by the selected probe appears.
  - ► On all other i.Series models, which have one probe, Upper Temperature Probe is displayed and the Temperature option is highlighted. Next to Current temperature, the current chamber temperature as read by the probe appears.
- **f** Press the INC or DEC button to increase or decrease the value to match the measured value. While the value next to Temperature changes, the value next to Current temperature remains unchanged.
- **g** Press the DOWN button. Store Calibration is highlighted.
- **h** Do one of the following:
  - ► If you want to save the new value, press the ENTER button. A message appears stating that the new calibration is memorized. The Current temperature value changes to the value you selected.
  - ► If you do not want to save the new value, press the BACK or HOME button to exit the Temperature Calibration screen.

NOTE:
- ► Shortly after you save the new value, the Current temperature value may change so that it no longer matches the new value. This is normal.
- ► If you enter a new value, but do not save it, that value appears the next time you view the setting for that probe.

4 Remove the independent thermometer from the chamber.

7.8 Testing chamber temperature alarms

NOTE: Regulations for your organization may recommend test methods different from what appear here. Use the appropriate methods for your organization.

Your incubator has alarms that indicate if the chamber temperature becomes too high or too low. The method to test these alarms varies by model.

For Horizon models, the temperature control probe is immersed in water. The temperature of the water is monitored as the water is slowly heated or cooled. The temperature at which each alarm activates is read from the temperature controller and compared to the appropriate setpoint that is programmed on the temperature controller.

For i.Series models, there are two methods of testing: automatic and manual. With the manual method, the temperature monitoring probe is immersed in water. The temperature of the water is monitored as the water is slowly heated or cooled. The temperature at which each alarm activates is read from the i.Center and compared to the appropriate setpoint that is programmed on the i.Center.

With the automatic test method, available only on i.Series models, the built-in Peltier device physically heats or cools the temperature monitoring probe until the appropriate alarm activates, and the activation temperatures are recorded in the event log on the i.Center. With this method, you do not have to insert the probe in water, and the temperature of the chamber is not affected.

Before testing the high and low temperature alarms, be sure that the temperature controller readout, as well as the i.Center readout on i.Series models, is calibrated.

7.8.1 Testing temperature alarms on Horizon Series models

CAUTION: Testing the alarms requires that you place the temperature control probe in water. The control system responds as though the chamber temperature is the water temperature, and adjusts the chamber temperature. Before testing the alarms, take precautions to protect items in the incubator from extended exposure to adverse temperatures per regulations for your organization.

Due to space limitations, the method for testing PC100h models differs from the method used for other models.

7.8.1.1 Testing temperature alarms on PC100h models

You must have the following to complete this procedure:

- The tube for alarm checks. The tube, which is located in the chamber, is used to hold the water to be used during the tests.
- Water to be used for the low alarm test. The water should be at least 1 °C lower than the low alarm setpoint, and there should be enough to fill the tube for alarm checks to a depth of at least 3 inches (8 cm). Avoid using extremely cold water: the temperature reading should change slowly so you can identify the alarm activation temperature more precisely.
- Water to be used for the high alarm test. The water should be at least 1 °C higher than the high alarm setpoint, and there should be enough to fill the tube for alarm checks to a depth of at least 3 inches (8 cm). Avoid using extremely hot water: the temperature reading should change slowly so you can identify the alarm activation temperature more precisely.

To test the temperature alarms

1. Verify that the temperature controller readout has been calibrated. For calibration instructions, see Section 7.6, “Calibrating the temperature controller readout.”
2. Identify the current settings for the low alarm setpoint and high alarm setpoint. For instructions, see Section 5.1, “Viewing and changing the setpoints for temperature alarms.”
3. Test the low temperature alarm.
   a. Using the water for the low alarm test, fill the tube for alarm checks to a depth of at least 3 inches (8 cm). After returning the tube to its holding bracket, slide the tube upward to immerse the tip of the temperature control probe.
   b. Watch the chamber temperature reading on the temperature controller. The temperature should decrease slowly (at a rate of about 0.5 °C per minute). When the temperature reaches the low alarm setpoint, and the alarm delay period elapses, the following should occur: an alarm should sound and -AL- and the red alarm light should flash.

4 Test the high temperature alarm.
   a Using the water for the high alarm test, fill the tube for alarm checks to a depth of at least 3 inches (8 cm). After returning the tube to its holding bracket, slide the tube upward to immerse the tip of the temperature control probe.
   b Watch the chamber temperature reading on the temperature controller. The temperature should increase slowly (at a rate of about 0.5 °C per minute). When the temperature reaches the high alarm setpoint, and the alarm delay period elapses, an alarm should sound and -AL- and the red alarm light should flash.
5 Dispose of the water and return the tube to the bracket. Slide the tube so that it is below the probe.

CAUTION: Leaving the probe covered during normal operation prevents the probe from accurately reading the chamber temperature.

7.8.1.2 Testing temperature alarms on Horizon Series models other than PC100h

You must have the following to complete this procedure:

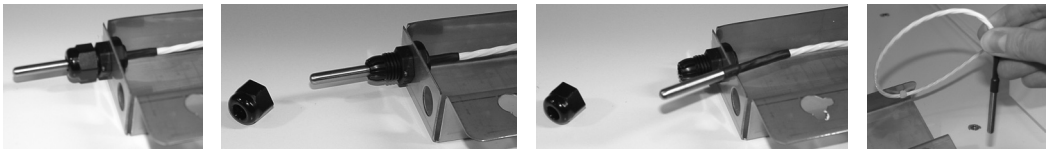
- A container for holding the water to be used during the tests. The container should be deep enough to keep the tip of the probe immersed in water. The volume of the container should be large enough to accommodate additional water that is used to raise or lower the temperature. The opening in the container should be at least 3.25 inches (8 cm) wide to accommodate the probe bracket (for more information, see steps 5-6 in the procedure that follows).
- Room-temperature water. The water should be at least 1 °C higher than the low alarm setpoint, and at least 1 °C lower than the high alarm setpoint. There should be enough to fill the test container to a depth of about 1 inch (2 cm).
- Crushed ice or chilled water to be used for the low alarm test. The ice or chilled water will be added to the test container to slowly lower the temperature of the water.
- Hot water to be used for the high alarm test. After the low alarm test has been completed, the hot water will be added to the test container to slowly raise the temperature of the water.

To test the temperature alarms

CAUTION: Temperature probes are fragile. Handle them with care.

1 Verify that the temperature controller readout has been calibrated. For calibration instructions, see Section 7.6, “Calibrating the temperature controller readout.”
2 Identify the current settings for the low alarm setpoint and high alarm setpoint. For instructions, see Section 5.1, “Viewing and changing the setpoints for temperature alarms.”
3 Prepare the container for testing. Using the room-temperature water, fill the container to a depth of at least 1 inch (2 cm). Also prepare a separate container with the crushed ice or chilled water, and a separate container with the hot water.
4 Remove the probe bracket from the chamber. Loosen the screws for the probe bracket, then slide the bracket upward. If an agitator is installed, you may need to move it to access the bracket.

5 (Optional) Remove the probe from the probe bracket. Although the bracket is designed to allow testing while the probe is installed, you may find that it is easier to test with the probe removed.



Removing the temperature control probe from the probe bracket

- **a** Near the tip of the probe, unscrew and remove the fitting that secures the probe to the bracket
- **b** Gently slide the tip of the probe toward the bracket until the probe is free of the bracket.

6 Place all three containers near the incubator. Immerse the tip of the probe in the container of room-temperature water. The temperature on the temperature controller should be within 1 °C of the chamber setpoint, and there should be no active alarms.

7 Test the low temperature alarm. While constantly stirring the probe in the container (keeping the tip immersed) and watching the temperature on the temperature controller, add the ice or chilled water a little at a time so that the temperature decreases slowly (at a rate of about 0.5 °C per minute). When the temperature reaches the low alarm setpoint, and the alarm delay period elapses, an alarm should sound and -AL- and the red alarm light should flash.

8 Test the high temperature alarm. While constantly stirring the probe in the container (keeping the tip immersed) and watching the temperature on the temperature controller, add the hot water a little at a time so that the temperature increases slowly (at a rate of about 0.5 °C per minute). When the temperature reaches the high alarm setpoint, and the alarm delay period elapses, an alarm should sound and -AL- and the red alarm light should flash.

9 Return the probe to the probe bracket (if previously removed) and reinstall the probe bracket.

- **a** Gently slide the tip of the probe towards the outside of the bracket until the tip is about 2 inches (5 cm) from the end of the bracket.
- **b** Tighten the fitting to secure the probe to the bracket. About 1 inch (2.5 cm) of the probe should be exposed.
- **c** Install the bracket in the chamber.
- **d** If you moved an agitator to access the probe bracket, move the agitator back to its original position.

7.8.2 Testing temperature alarms manually on i.Series models

CAUTION: The door must be left open during testing, which may affect the chamber temperature. Before testing the alarms manually, take precautions to protect items in the incubator from extended exposure to adverse temperatures per regulations for your organization.

Due to space limitations, the method for testing PC100i models differs from the method used for other models.

7.8.2.1 Testing temperature alarms manually on PC100i models

You must have the following to complete this procedure:

► The tube for alarm checks. The tube, which is located in the chamber, is used to hold the water to be used during the tests.

- Water to be used for the low alarm test. The water should be at least 1 °C lower than the low alarm setpoint, and there should be enough to fill the tube for alarm checks to a depth of at least 2 inches (5 cm). Avoid using extremely cold water: the temperature reading should change slowly so you can identify the alarm activation temperature more precisely.
- Water to be used for the high alarm test. The water should be at least 1 °C higher than the high alarm setpoint, and there should be enough to fill the tube for alarm checks to a depth of at least 2 inches (5 cm). Avoid using extremely hot water: the temperature reading should change slowly so you can identify the alarm activation temperature more precisely.

To test the temperature alarms manually

1. Verify that the temperature controller readout has been calibrated. For calibration instructions, see Section 7.6, “Calibrating the temperature controller readout.”
2. Verify that the reading for the upper temperature monitoring probe has been calibrated. For calibration instructions, see Section 7.7, “Calibrating temperature readings on the i.Center.”
3. Identify the current settings for the low alarm setpoint and high alarm setpoint. For instructions, see Section 4.2, “Viewing current settings.”
4. Test the low temperature alarm.
   a. Using the water for the low alarm test, fill the tube for alarm checks to a depth of at least 2 inches (5 cm). After returning the tube to its holding bracket, slide the tube upward to immerse the tip of the temperature monitoring probe.
   b. Watch the chamber temperature reading on the i.Center display. The temperature should decrease slowly (at a rate of about 0.5 °C per minute). When the temperature reaches the low alarm setpoint, an alarm should sound and Low Temp should appear on the i.Center display.
5. Test the high temperature alarm.
   a. Using the water for the high alarm test, fill the tube for alarm checks to a depth of at least 2 inches (5 cm). After returning the tube to its holding bracket, slide the tube upward to immerse the tip of the temperature monitoring probe.
   b. Watch the chamber temperature reading on the i.Center display. The temperature should increase slowly (at a rate of about 0.5 °C per minute). When the temperature reaches the high alarm setpoint, an alarm should sound and High Temp should appear on the i.Center display.
6. Dispose of the water and return the tube to the bracket. Slide the tube so that it is below the probe.

CAUTION: Leaving the probe covered during normal operation prevents the probe from accurately reading the chamber temperature.

7.8.2.2 Testing temperature alarms manually on i.Series models other than PC100i

You must have the following to complete this procedure:

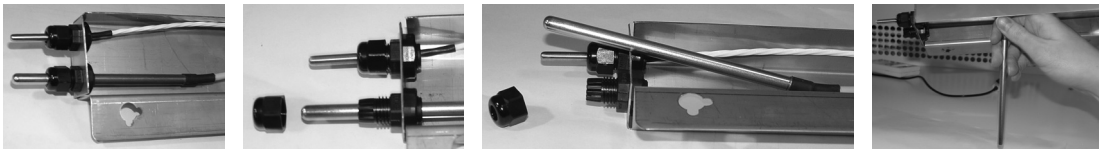
- A container for holding the water to be used during the tests. The container should be deep enough to keep the tip of the probe immersed in water. The volume of the container should be large enough to accommodate additional water that is used to raise or lower the temperature. The opening in the container should be at least 3.25 inches (8 cm) wide to accommodate the probe bracket (for more information, see steps 6-7 in the procedure that follows).
- Room-temperature water. The water should be at least 1 °C higher than the low alarm setpoint, and at least 1 °C lower than the high alarm setpoint. There should be enough to fill the test container to a depth of about 1 inch (2 cm).

- ► Crushed ice or chilled water to be used for the low alarm test. The ice or chilled water will be added to the test container to slowly lower the temperature of the water.
- ► Hot water to be used for the high alarm test. After the low alarm test has been completed, the hot water will be added to the test container to slowly raise the temperature of the water.

To test the temperature alarms

CAUTION: Temperature probes are fragile. Handle them with care.

1. Verify that the temperature controller readout has been calibrated. For calibration instructions, see Section 7.6, “Calibrating the temperature controller readout.”
2. Verify that the reading for the upper temperature monitoring probe has been calibrated. For calibration instructions, see Section 7.7, “Calibrating temperature readings on the i.Center.”
3. Identify the current settings for the low alarm setpoint and high alarm setpoint. For instructions, see Section 4.2, “Viewing current settings.”
4. Prepare the container for testing. Using the room-temperature water, fill the container to a depth of at least 1 inch (2 cm). Also prepare a separate container with the crushed ice or chilled water, and a separate container with the hot water.
5. Remove the probe bracket from the chamber. Loosen the screws for the probe bracket, then slide the bracket upward. If an agitator is installed, you may need to move it to access the bracket.
6. (Optional) Remove the upper temperature probe (the longer probe) from the probe bracket. Although the bracket is designed to allow testing while the probe is installed, you may find that it is easier to test with the probe removed.



Removing the upper temperature probe from the probe bracket

   a. Near the tip of the probe, unscrew and remove the fitting that secures the probe to the bracket
   b. Gently slide the tip of the probe toward the bracket until the probe is free of the bracket.
7. Place all three containers near the incubator. Immerse the tip of the upper temperature probe (the longer probe) in the container of room-temperature water. The temperature on the i.Center display should be within 1 °C of the chamber setpoint, and there should be no active alarms.
8. Test the low temperature alarm. While constantly stirring the probe in the container (keeping the tip immersed) and watching the temperature on the i.Center display, add the ice or chilled water a little at a time so that the temperature decreases slowly (at a rate of about 0.5 °C per minute). When the temperature reaches the low alarm setpoint, an alarm should sound and Low Temp should appear on the i.Center display.
9. Test the high temperature alarm. While constantly stirring the probe in the container (keeping the tip immersed) and watching the temperature on the i.Center display, add the hot water a little at a time so that the temperature increases slowly (at a rate of about 0.5 °C per minute). When the temperature reaches the high alarm setpoint, an alarm should sound and High Temp should appear on the i.Center display.

10 Return the probe to the probe bracket (if previously removed) and reinstall the probe bracket.
   a Gently slide the tip of the probe towards the outside of the bracket until the tip is about 2 inches (5 cm) from the end of the bracket.
   b Tighten the fitting to secure the probe to the bracket. About 1 inch (2.5 cm) of the probe should be exposed.
   c Install the bracket in the chamber.
   d If you moved an agitator to access the probe bracket, move the agitator back to its original position.

7.8.3 Testing temperature alarms automatically on i.Series models

When you perform an automatic low alarm test, the Peltier device cools the probe until the low alarm setpoint is reached. During the test, a LOW ALARM TEST IN PROGRESS message appears on the HOME screen. When the temperature reaches the setpoint, an alarm sounds, the temperature reading flashes, and an event is added to the event log indicating that the low temperature alarm was started. When the temperature rises above the setpoint, the audible and visual alarms clear. An event is added to the event log indicating that the low temperature alarm was reset. The LOW ALARM TEST IN PROGRESS message clears, indicating that the test is complete. The process can take a few minutes.

When you perform an automatic high alarm test, the Peltier device heats the probe until the high alarm setpoint is reached. During the test, a HIGH ALARM TEST IN PROGRESS message appears on the HOME screen. When the temperature reaches the setpoint, an alarm sounds, the temperature reading flashes, and an event is added to the event log indicating that the high temperature alarm was started. When the temperature falls below the setpoint, the audible and visual alarms clear. An event is added to the event log indicating that the high temperature alarm was reset. The HIGH ALARM TEST IN PROGRESS message clears, indicating that the test is complete. The process can take a few minutes.

When you cancel an automatic test, the message indicating that the test is in progress clears immediately. If a setpoint was reached before you cancelled the test, the alarm activates and clears as described earlier.

To automatically test the low temperature alarm

1 Identify the current setting for the low alarm setpoint.
2 From the MAIN screen, use the buttons to navigate to and select the System Alarm Test & Status option. The SYSTEM ALARM TEST & STATUS screen appears.
3 Press the UP or DOWN button until the Start Low Alarm Auto Test option is highlighted.
4 Press the ENTER button. You are returned to the HOME screen. Under the reading for the upper temperature probe, a LOW ALARM TEST IN PROGRESS message appears. When the test is complete, the LOW ALARM TEST IN PROGRESS message clears.
5 View the event log to determine the temperature at the time the low temperature alarm event started. Compare this value to the alarm setpoint. If the values do not match, see Section 8, “Understanding and addressing operational issues” for information on how to proceed.

To automatically test the high temperature alarm

1 Identify the current setting for the high alarm setpoint.
2 From the MAIN screen, use the buttons to navigate to and select the System Alarm Test & Status option. The SYSTEM ALARM TEST & STATUS screen appears.
3 Press the UP or DOWN button until the Start High Alarm Auto Test option is highlighted.
4 Press the ENTER button. You are returned to the HOME screen. Under the reading for the upper temperature probe, a HIGH ALARM TEST IN PROGRESS message appears. When the test is complete, the HIGH ALARM TEST IN PROGRESS message clears.

5 View the event log to determine the temperature at the time the high temperature alarm event started. Compare this value to the alarm setpoint. If the values do not match, see Section 8, "Understanding and addressing operational issues" for information on how to proceed.

To cancel an automatic test in progress

1 From the MAIN screen, use the buttons to navigate to and select the System Alarm Test & Status option. The SYSTEM ALARM TEST & STATUS screen appears.
2 Press the UP or DOWN button until the Cancel High or Low Test option is highlighted.
3 Press the ENTER button. The test is cancelled.

7.9 Testing the power failure alarm

CAUTION: Testing the power failure alarm requires that you turn off the power to the incubator, which may affect the chamber temperature. Before testing the alarm, take precautions to protect items in the incubator from extended exposure to adverse temperatures.

You can test the power failure alarm to ensure that it activates appropriately.

During a power failure, the backup batteries continue to provide power to the monitoring system.

To test the power failure alarm on i.Series models

1 Confirm that the incubator is connected to AC power.
2 Identify the current setting for the power failure timeout.
3 Change the setting for the power failure timeout to zero minutes. For instructions, see Section 4.4.2, "Changing the setpoints for the door open and power failure alarms."
4 Confirm that the key switch for the backup battery is turned to the On (|) position.
5 Press the main power switch to the Off (O) position. The power failure alarm should activate immediately, causing the following to happen: the audible alarm sounds, the AC Power Failure message appears on the HOME screen, and an event is added to the event log indicating that the power failure alarm condition started.
6 Press the main power switch to the On (|) position. The power failure alarm should clear, causing the following to happen: the audible alarm clears, the AC Power Failure message clears from the HOME screen, and an event is added to the event log indicating that the power failure alarm condition reset.
7 Change the setting for the power failure timeout back to the original value.

To test the power failure alarm on Horizon Series models

1 Confirm that the incubator is connected to AC power and that the leads are connected to the backup battery for the monitoring system.
2 On the front of the incubator, enable the audible temperature and power failure alarm.
   ► For PC4200h models, turn the key switch to Position 2 to enable the audible temperature and power failure alarm, but disable the motion alarm.
   ► For all other Horizon models, turn the key switch to the On (|) position.
3 Turn off the incubator by pressing the main power switch to the Off (O) position.
4 Disconnect the incubator from power. The power failure alarm should activate immediately.
5 Connect the incubator to power. The power failure alarm should clear.
6 Turn on the incubator by pressing the main power switch to the On (|) position.

7.10 Testing the motion alarm

NOTE: This section only applies for i.Series models and PC4200h models.

CAUTION: Testing the motion alarm requires that you open the door to the incubator, which may affect the chamber temperature. Before testing the alarm, take precautions to protect items in the incubator from extended exposure to adverse temperatures.

To test the motion alarm on i.Series models

1. Confirm that the incubator is connected to AC power.
2. Identify the current settings for Agitator Alarm 1.
3. Change the settings for Agitator Alarm 1 so that the alarm is ON (enabled) and the timeout is set to zero minutes. For instructions, see Section 4.4.3, "Changing the settings for motion alarms."
4. Turn on the incubator and start agitation by doing one of the following:
   - ► For PC4200i models, press the main power switch to the On (|) position and close the doors.
   - ► For all other i.Series models, press the main power switch to the On (|) position on the incubator and on the agitators, and close the doors.
5. Stop agitation by opening a door on the incubator. The motion alarm should activate immediately, causing the following to happen: the audible alarm sounds, the Agitator 1 Stopped message appears on the HOME screen, and an event is added to the event log indicating that the motion alarm condition started.
6. Start agitation by closing the doors on the incubator. The motion alarm should clear, causing the following to happen: the audible alarm clears, the Agitator 1 Stopped message clears from the HOME screen, and an event is added to the event log indicating that the motion alarm condition reset.
7. Change the settings for Agitator Alarm 1 back to the original values.

To test the motion alarm on PC4200h models

1. Confirm that the incubator is connected to AC power.
2. On the front of the incubator, enable the audible motion alarm by turning the key switch to Position 1.
3. Start agitation by pressing the main power switch to the On (|) position.
4. Stop agitation by opening a door on the incubator. After the motion alarm delay period elapses, the motion alarm should activate, causing an audible alarm to sound.
5. Start agitation by closing the doors on the incubator. The motion alarm should clear.

7.11 Testing the door open alarm

NOTE: This section only applies to i.Series models.

CAUTION: Testing the door open alarm may require that you leave the incubator door open for an extended period of time, which may affect the chamber temperature. Before testing the alarm, take precautions to protect items in the incubator from extended exposure to adverse temperatures.

You can test the door open alarm to ensure that it activates at the appropriate time.

To test the door open alarm

1. Identify the current setting for the Door Ajar Timeout.
2. Change the setting to zero minutes. For instructions, see Section 4.4.2, "Changing the setpoints for the door open and power failure alarms."
3. Open the incubator door. The door open alarm should activate immediately, causing the following to happen: the audible alarm sounds, the Door Open message appears on the HOME screen, and an event is added to the event log indicating that the door open alarm condition started.
4. Close the incubator door. The door open alarm should clear, causing the following to happen: the audible alarm clears, the Door Open message clears from the HOME screen and an event is added to the event log indicating that the door open alarm condition reset.
5. Change the setting back to the original value.

7.12 Testing the No Battery alarm

NOTE: This section only applies to i.Series models.

WARNING: Removing the access panel from the incubator exposes you to the risk of electric shock. Regulations for your organization may require that only designated service personnel remove the access panel. Follow the guidelines for your organization.

CAUTION: Testing the No Battery alarm requires that you turn off the power to the incubator, which may affect the chamber temperature. Before testing the alarm, take precautions to protect items in the incubator from extended exposure to adverse temperatures.

You can test the No Battery alarm to ensure that it activates if the backup batteries for the monitoring system are missing or if the charge is so low that the batteries are not detectable.

To test the No Battery alarm

1. Turn off the incubator and disconnect it from AC power.
2. On the top of the incubator, remove the access panel.
3. From the battery holder for the monitoring system, remove a battery.
4. Connect the incubator to AC power.
5. Turn on the incubator. The No Battery alarm should activate, causing the following to happen: the audible alarm sounds, the No Battery message appears on the HOME screen, and an event is added to the event log indicating that the No Battery alarm was started.
6. Turn off the incubator and disconnect it from AC power.
7. Insert the battery into the battery holder.
8. Connect the incubator to AC power.
9. Turn on the incubator. The No Battery alarm should clear, causing the following to happen: the audible alarm clears, the No Battery message clears from the HOME screen, and an event is added to the event log indicating that the No Battery alarm was reset.
10. Install the access panel.

8 Understanding and addressing operational issues

This section describes issues that you may experience while using the incubator, explains possible causes, and provides actions you can take to correct them. If a problem remains, you may need to contact a qualified service technician to troubleshoot and address the problem.

For problems specific to an agitator that you have installed in the incubator, refer to the Operation Manual for your agitator. For problems specific to the chart recorder, refer to the Chart Recorder Operation Manual.

WARNING: Review all safety instructions prior to completing troubleshooting recommendations. For more information, see Section 1, "Working safely."

8.1 Addressing general operation problems

Problem	Possible Cause	Action
The display on the monitoring system is hard to read (applies to i.Series models only).	The screen contrast is set too low.	► Change the screen contrast. For instructions, see Section 6.5, "Adjusting the screen contrast."
The monitoring system is not responding (applies to i.Series models only).	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system. For instructions, see Section 8.6, "Resetting the i.Center monitoring system."
A roll-out shelf does not slide easily (applies to PC2200 and PC3200 models only).	There is debris in the shelf slides.	► Pull the shelf out and confirm that the slides are free of debris. Clean if necessary.
	The shelf slides are not lubricated.	► Using a lightweight oil, lubricate the bearings in the slides.
	A drawer slide is faulty.	► Contact a qualified service technician.
A drawer does not slide easily (applies to PC4200 models only).	There is debris in the slots of the drawer guides.	► Pull the drawer out and confirm that the slots are free of debris. Clean if necessary.
	The drawers are not lubricated.	► Clean and lubricate the drawers. For more information, see Section 7.4.1, "Maintaining drawers."
A door does not open easily (applies to PC100 and floor models only).	There is debris in the hinges.	► Confirm that the hinges are free of debris. Clean the hinges if necessary.
	The door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	A hinge cam is faulty.	► Contact a qualified service technician.
The hood does not open easily (applies to PC900 and PC1200 models only).	The damping cylinder or hood hinge is faulty.	► Contact a qualified service technician.
The incubator does not roll easily (applies to floor models only).	One or more casters are locked	► Unlock the casters. Push the incubator from the sides, not from the front or back.

Problem	Possible Cause	Action
The incubator is receiving AC power, and the doors are closed, but the built-in agitator is not moving (applies to PC 4200 models only).	The agitator is obstructed.	► Verify that the agitator is free of obstructions.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
Agitation is noisy or rough (applies to PC4200 models only).	The incubator is not level.	► Verify that the incubator has been set up appropriately. For more information, see Section 3.3, “Selecting an appropriate location.”
	Moving parts are grinding against each other.	► Verify that moving parts are lubricated and in good condition. Lubricate or replace them if necessary. For more information, see Section 7.4, “Maintaining moving parts on the built-in agitator.”
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

8.2 Addressing chamber temperature problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature (applies to i.Series models only)	The monitor is not calibrated.	► Confirm that the upper temperature probe is reading correctly. Calibrate the probe if necessary. For more information and instructions, see Section 7.7, “Calibrating temperature readings on the i.Center.”
	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system. For instructions, see Section 8.6, “Resetting the i.Center monitoring system.”
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
The chamber temperature does not stabilize at the incubator setpoint.	The condenser grill is dirty.	► Check the condenser grill. Clean it if necessary. For instructions, see Section 7.3.1, “Cleaning the condenser grill.”
	The circulation at the top of the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	The ambient air temperature around the incubator is too high.	► Confirm that the incubator is placed appropriately. For more information, see Section 3.3, “Selecting an appropriate location.”
	The refrigerant level is too low.	► Contact a qualified service technician.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

8.3 Addressing alarm activation problems

Problem	Possible Cause	Action
The incubator is in an alarm condition, but alarms are not audible.	Audible alarms have been muted.	► Verify that audible alarms are not muted. For i.Series models, if the time remaining on the MUTE timer is greater than 5 minutes, change the MUTE timer value to 5 minutes and wait until the timer resets. For more information and instructions, see Section 6.4, “Controlling the sound for audible alarms.”
	Audible alarms have been disabled (applies to Horizon Series models only).	► Verify that audible alarms are not disabled. For more information and instructions, see Section 6.4.3, “Enabling and disabling alarms on Horizon Series models.”
	The volume is set too low.	► Check the volume and change it if necessary. For more information and instructions for i.Series models, see Section 4.4.4, “Changing the audible alarm characteristics.” For Horizon Series models, see Section 5.3, “Changing the volume for audible alarms.”
	The alarm is not communicated audibly, only visually or through the remote alarm interface.	► Verify whether the active alarm should be communicated audibly. For more information, see Section 9.2, “Alarm reference.”
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
All alarms are activating sporadically.	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
The No Battery alarm is activating sporadically (applies to i.Series models only).	The battery voltage level on the backup batteries for the monitoring system is low.	► Replace the backup batteries for the monitoring system. For instructions, see Section 7.2.1, “Checking and replacing batteries for the i.Center monitoring system.”
The incubator meets a high or low temperature alarm condition, but the appropriate alarm is not active.	The alarm setpoint was changed.	► Check the current setpoints for the alarms. Change the setpoints if necessary. For more information and instructions for i.Series models, see Section 4.4.1, “Changing the setpoints for temperature alarms.” For Horizon Series models, see Section 5.1, “Viewing and changing the setpoints for temperature alarms.”
	The end of the delay period for the alarm has not been reached (applies to Horizon Series models only)	► Wait until the delay period has ended. The alarm should activate. For more information, see Section 5.2.1, “Delaying temperature alarms.”
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

Problem	Possible Cause	Action
There is an active temperature alarm, but the incubator does not meet a high or low temperature condition.	The monitor is not calibrated (applies to i.Series models only).	► Confirm that the upper temperature probe is reading within the appropriate tolerance for your organization. Calibrate the probe if necessary. For more information and instructions, see Section 7.7, "Calibrating temperature readings on the i.Center."
A high or low temperature alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	The monitor is not calibrated (applies to i.Series models only).	► Confirm that the upper temperature probe is reading within the appropriate tolerance for your organization. Calibrate the probe if necessary. For more information and instructions, see Section 7.7, "Calibrating temperature readings on the i.Center."
	The temperature changed slightly around the time of activation.	► No action needed.
The incubator is not receiving AC power, but the power failure alarm is not active.	The alarm setpoint was changed (applies to i.Series models only).	► Check the current setpoints for the alarms. Change the setpoints if necessary. For more information and instructions, see Section 4.4.2, "Changing the setpoints for the door open and power failure alarms."
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
The condenser alarm is active (applies to i.Series models only).	The compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean it if necessary. For instructions, see Section 7.3.1, "Cleaning the condenser grill." ► Confirm that the incubator is placed appropriately. For more information, see Section 3.3, "Selecting an appropriate location."
	The condenser alarm setpoint is too low.	► Confirm that the alarm setpoint is set at the appropriate value. For more information, see Section 4.2, "Viewing current settings."
	The refrigerant level is too low.	► Contact a qualified service technician.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	The condenser probe is not calibrated.	► Contact a qualified service technician.

Problem	Possible Cause	Action
The incubator is connected to power, but the AC Power Failure alarm is active.	The circuit breakers have tripped or are not seated correctly (applies to all floor models that are 115 V, and all countertop models).	► Confirm that the circuit breakers are seated. Push the circuit breakers to reset them if necessary. If you cannot reset them, or they trip again, contact a qualified service technician. To locate circuit breakers for your model, see Section 2.3, "Touring the rear." (Note: 115 V countertop models only have one circuit breaker.)
	The fuses have blown (applies to all floor models that are 230 V).	► Contact a qualified service technician.
	There is no AC power to the incubator.	► Verify that the power cord is connected securely to the incubator and the outlet. Tighten the connections if necessary. ► Verify that the outlet is operational and meets the power requirements for the incubator. Repair the original outlet or connect to a different outlet if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
The Door Open alarm is activating sporadically (applies to i.Series models only).	The Door Ajar Timeout is set to zero, causing the alarm to activate immediately when the door is opened (applies to i.Series models only)	► Check the current setpoint for the Door Ajar alarm. Change the setpoint if necessary. For more information and instructions see Section 4.4.2, "Changing the setpoints for the door open and power failure alarms."
	The doors are not closing completely.	► Confirm that the doors are aligned. Contact a qualified service technician if necessary.
	The doors are closing but not sealing completely.	► Confirm that the door gasket seals completely. Contact a qualified service technician if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
The motion alarm is active, but the agitator is moving.	A Horizon Series agitator is installed, but the alarm for the corresponding position was not disabled.	► Disable the motion alarm for that position. For more information and instructions, see Section 4.4.3, "Changing the settings for motion alarms."
	The i.Center monitoring system is not receiving motion information from the agitator (applies only to i.Series models without a built-in agitator).	► On the incubator's monitoring system, check whether agitator information is being received. For more information, see Section 6.9.1, "Viewing real-time agitation information." ► Verify that the I/O cable is connected securely to the agitator and the corresponding port in the incubator. Tighten the connections if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

Problem	Possible Cause	Action
Agitation has stopped, but the motion alarm is not active.	The motion alarm for the position where the agitator is installed has been disabled (applies to i.Series models only).	► Enable the motion alarm. For more information, see Section 4.4.3, “Changing the settings for motion alarms.”
	The agitator alarm setpoint value has not been reached (applies to i.Series models only)	► Wait until the setpoint has been reached. The alarm should activate. For more information, see Section 4.4.3, “Changing the settings for motion alarms.”
	The delay period for the motion alarm is set too low (applies to PC4200i models only)	► Verify that the delay period control is set to a value that is greater than the agitator alarm setpoint. For more information and instructions, see Section 4.4.3, “Changing the settings for motion alarms.”
	The end of the delay period for the motion alarm has not been reached (applies to Horizon models only)	► Wait until the delay period has ended. The alarm should activate. For more information about PC4200 models, see Section 5.2.2, “Delaying the motion alarm.” For more information about the delay period on installed i.Series agitators, refer to the Operation Manual for your agitator.
	The motion alarm system is not receiving power.	► Check that there is AC power to the incubator. ► Test the backup battery. If the battery is not functioning, replace the battery. For instructions, see Section 7.2.3, “Testing and replacing the battery for the motion alarm.”
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
The motion alarm is activating sporadically while the agitator is moving.	The alarm system is not receiving power consistently (applies to PC4200 models only).	► Check that there is AC power to the agitator. ► Test the backup battery. If the battery is not functioning, or has been in use for one year, replace the battery. For instructions, see Section 7.2.3, “Testing and replacing the battery for the motion alarm.”
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
The motion alarm is active, but there is no agitator installed at that position (applies only to i.Series models without a built-in agitator).	The alarm is enabled for that position when it should be disabled.	► Disable the motion alarm for that position. For more information and instructions, see Section 4.4.3, “Changing the settings for motion alarms.”
The motion alarm is activating immediately when agitation is started (applies to PC4200h models only).	The delay period is set to 0 minutes, which activates the alarm before motion can be sensed.	► Change the delay period to a value greater than 0 minutes. For instructions, see Section 5.2.2, “Delaying the motion alarm.”
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

8.4 Addressing testing problems

Problem	Possible Cause	Action
The automatic temperature tests do not work (applies to i.Series models only).	The High Alarm setpoint is set significantly higher than the default value, or the Low Alarm setpoint is set significantly lower than the default value.	► Confirm that the alarm setpoints are set at the appropriate values. For more information, see Section 4.2, “Viewing current settings.” ► Test the temperature alarms manually. For more information and instructions, see Section 7.8, “Testing chamber temperature alarms.”
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

8.5 Addressing condensation problems

Problem	Possible Cause	Action
There is excessive water in the water evaporation tray.	Humid air is entering the chamber.	► Confirm that the incubator is level, and that the doors are aligned, closing tightly, and sealing correctly. Contact a qualified service technician to correct issues as necessary.
	The heater in the evaporation tray is faulty.	► Confirm that the heater is hot. Contact a qualified service technician to confirm that the heater is drawing the appropriate current.
There is excessive water in the chamber.	Humid air is entering the chamber.	► Confirm that the incubator is level, and that the doors are aligned, closing tightly, and sealing correctly. Contact a qualified service technician to correct issues as necessary.
There is excessive humidity on the doors.	Humid air is entering the chamber.	► Confirm that the incubator is level, and that the doors are aligned, closing tightly, and sealing correctly. Contact a qualified service technician to correct issues as necessary.
	The relative humidity around the incubator is too high.	► Confirm that the incubator is placed appropriately. For more information, see Section 3.3, “Selecting an appropriate location.”

8.6 Resetting the i.Center monitoring system

NOTE: This section only applies to i.Series models.

Use the following procedure to reset the i.Center monitoring system.

To reset the monitoring system

1. From the battery backup, remove one battery.
2. Disconnect the incubator from power.
3. Connect the incubator to power. For more information, see Section 3.5.1, “Connecting to AC power.”
4. Replace the battery.

8.7 Viewing manufacturer and product information

NOTE: This section only applies to i.Series models.

You can view software version information for control and display components of the i.Center monitoring system. You can also view information for contacting Helmer.

To view manufacturer and product information

1. From the MAIN screen, use the buttons to navigate to and select the Product/Company Information option. The Helmer logo appears briefly, followed by the INFORMATION screen. The INFORMATION screen displays the Control Version and the Display Version.
2. Press the NEXT button. The manufacturer information appears.

9 Reference information

9.1 i.Center monitoring system screen reference

NOTE: This section only applies to i.Series models.

This section shows the screens and options available in the monitoring system.

HOME screen

MAIN button

MAIN screen

MUTE button (changes mute timer)

MAIN screen

Event Log option

(Press the SELECT button)

EVENT LOG screen

EVENT LOG DETAIL screen

System Alarm Test & Status option

SYSTEM ALARM TEST & STATUS screen

Start High Alarm Auto Test option

Start Low Alarm Auto Test option

Cancel High or Low Test option

Chart Paper Days Left or **Chart Paper Timer** display

Door Status display

Condenser Temp display

Edit Configuration option

(Enter the password)

CONFIGURATION screen

Set Date & Time option

SET DATE & TIME screen

System Options option

SYSTEM OPTIONS screen

Language option

Alarm Volume option

Alarm Pulse option

Temperature Units option

Temperature Graph option

Chart Paper Timer option

Alarm Setpoints option

SET ALARM SETPOINT screen

High Alarm Setpoint option

Low Alarm Setpoint option

Cond. Alarm Setpoint option

Door Ajar Timeout option
Power Failure Timeout option
Agitator Alarm Setpoints option
AGITATOR ALARM SETPOINT screen
Agitator 1 Setpoint option
Agitator 1 option
Agitator 2 Setpoint option
Agitator 2 option
Agitator 3 Setpoint option
Agitator 3 option
Temperature Calibration option
TEMPERATURE CALIBRATION screen
Select Temp Probe option or **Upper Temperature probe** display
Temperature option
Factory Default Settings option
FACTORY DEFAULT SETTINGS screen
Change Password option
(Enter a new password)
View Configuration option
VIEW CONFIGURATION screen
Clock Mode display
Date Format display
Door Ajar Timeout display
Pwr Failure Timeout display
High Alarm Setpoint display
Low Alarm Setpoint display
Cond. Alarm Setpoint display
Alarm Volume display
Alarm Pulse display
Chart Paper Days Left or **Chart Paper Timer** display
Agitator Alarms display
Temperature Graph display
Product/Company Information option
INFORMATION screen
i.Help option
i.Help screen
Agitator Information option
AGITATOR INFORMATION screen
Agitator RPM option
AGITATOR RPM screen
Agitator Cycles option
AGITATOR TOTAL CYCLE COUNT screen
Reset option
RESET AGITATOR screen
Agitator Count Logs option
AGITATOR COUNT LOGS screen

9.2 Alarm reference

If an alarm condition is met, an alarm activates. Some alarms are visual only, while others are visual and audible. Some alarms are sent through the remote alarm interface.

The following table indicates if an alarm for a particular model is audible (A), visual (V), or sent through the remote alarm interface (R). Messages for visual alarms, if applicable, appear in the table as well. Additional information about applicability is noted below the table.

Alarm	Incubator models	
	i.Series	Horizon Series
Door Open	A, V (“Door Open”), R	
High temperature	A, V (“High Temp”), R	A, V (“-AL-”), R
Low temperature	A, V, (“Low Temp”) R	A, V (“-AL-”), R
Condenser temperature	A, V (“Condenser Over-Temp”), R	
Low battery	V (“Low Battery”)	
No battery	A, V (“No Battery”), R	
AC power failure	A, V (“AC Power Failure”), R	A, R
Change chart paper[1]	V (“Change Chart Paper”)	
Agitator 1 motion alarm[2]	A, V (“Agitator 1 Stopped”), R	A (PC4200h only), R
Agitator 2 motion alarm[3]	A, V (“Agitator 2 Stopped”), R	R[5]
Agitator 3 motion alarm[4]	A, V (“Agitator 3 Stopped”), R	R[5]

[1]The Change chart paper alarm applies only if a chart recorder is installed. Additional alarms may be available on the chart recorder. For more information, refer to the Operation Manual for your chart recorder.

[2]The Agitator 1 motion alarm applies to all PC4200 models, but for all other models, this alarm applies if the agitator installed at this position is a Helmer i.Series model.

[3] The Agitator 2 motion alarm applies only to PC2200 and PC3200 models that have a Helmer i.Series model agitator installed at this position.

[4]The Agitator 3 motion alarm applies only to PC3200 models that have a Helmer i.Series model agitator installed at this position.

[5]The Agitator 2 and 3 motion alarms do not apply for PC4200h models.

9.3 Technical specifications

9.3.1 Power

9.3.1.1 Input voltage and frequency

The requirements for the input voltage and frequency vary depending on the destination of the incubator. The requirements for a particular incubator are specified on the Product Specification label. The voltage tolerance is ± 10% of the nominal voltage.

Options are as follows:

- 115 V 60 Hz
- 230 V 50 Hz
- 230 V 60 Hz

9.3.1.2 Power consumption

The power consumption for a particular incubator is specified on the Product Specification label. This value reflects the maximum number of agitators operating inside the incubator. Power consumption is measured in full load Amperes.

Input voltage	Model					
	PC100h, PC100i	PC900h, PC900i	PC1200h, PC1200i	PC2200h, PC2200i	PC3200h, PC3200i	PC4200h, PC4200i
115 V	8.0 A	9.0 A	9.0 A	11.5 A	12.0 A	14.5 A
230 V	5.0 A	4.5 A	4.5 A	7.0 A	7.0 A	8.3 A

9.3.1.3 Circuit breakers

All 115 V countertop models have one circuit breaker. All 115 V floor models and all 230 V countertop models have two circuit breakers. 230 V floor models do not have circuit breakers. The ratings are as follows:

Input Voltage	Model					
	PC100h, PC100i	PC900h, PC900i	PC1200h, PC1200i	PC2200h, PC2200i	PC3200h, PC3200i	PC4200h, PC4200i
115 V	12 A	12 A	12 A	15 A + 2 A	15 A + 2 A	20 A + 5 A
230 V	6 A + 6 A	6 A + 6 A	6 A + 6 A	-	-	-

9.3.1.4 Fuses

All 230 V floor models have two fuses. All other models do not have fuses.

Fuses are 5 mm x 20 mm, Time Lag (Type T).

Input Voltage	Model		
	PC2200h, PC2200i	PC3200h, PC3200i	PC4200h, PC4200i
230 V	10 A + 10 A	10 A + 10 A	10 A + 10 A

9.3.1.5 Load capacity for alarm contacts

The terminals on the remote alarm interface have the following maximum load capacity:

- ► i.Series models: 0.5 A at 125 V ac; 1 A at 24 V dc
- ► Horizon Series models: 0.25 A at 60 V ac; 0.25 A at 100 V dc

9.3.1.6 Maximum current draw for internal outlets

All models except the PC4200 models have one or more outlets inside the incubator. The maximum current draw for each outlet is 0.5 A.

9.3.1.7 Batteries

- ► (i.Series models only) Six 1.5 V D-cell non-rechargeable alkaline (or equivalent) batteries are required for backup power to the i.Center monitoring system
- ► (Horizon Series models only) One 9 V non-rechargeable alkaline (or equivalent) battery is required for backup power to the power failure alarm
- ► (PC4200 models only) One 9 V rechargeable Nickel-Metal Hydride (NiMH) battery (or equivalent) is required for backup power to the motion alarm system
- ► (Models with a chart recorder only) One 9 V non-rechargeable alkaline (or equivalent) battery is required for backup power to the chart recorder

9.3.2 Weight

PC100h, PC100i	PC900h, PC900i	PC1200h, PC1200i	PC2200h, PC2200i	PC3200h, PC3200i	PC4200h, PC4200i
105 lb	159 lb	208 lb	363 lb	431 lb	663 lb
48 kg	72 kg	94 kg	165 kg	196 kg	301 kg

9.3.3 Size

All dimensions are for the overall exterior and include items that protrude from the main unit, unless specified otherwise.

Model	Width	Height	Depth
PC100h, PC100i	21.25 in (54 cm)	25.00 in (64 cm)	23.50 in (60 cm)
PC900h, PC900i	26.50 in (67 cm)	30.25 in (77 cm)	27.75 in (71 cm)
PC1200h, PC1200i	40.75 in (104 cm)	30.25 in (77 cm)	27.75 in (71 cm)
PC2200h, PC2200i	40.25 in (103 cm)	60.00 in (153 cm)	30.25 in (77 cm)
PC3200h, PC3200i	40.25 in (103 cm)	75.50 in (192 cm)	30.25 in (77 cm)
PC4200h, PC4200i	40.25 in (103 cm)	75.50 in (192 cm)	30.25 in (77 cm)

9.3.4 Operating conditions

This agitator is designed for indoor use only.

Altitude (maximum): 2000 m

Ambient temperature range: 15 °C to 35 °C

Relative humidity (maximum for ambient temperature): 80%

Temperature control range: 20 °C to 35 °C

9.3.5 Agitation speed

On PC4200 models, the agitation speed varies by input voltage and frequency. The speed tolerance is ±10% of the nominal speed.

Model	Input voltage and frequency	Agitation speed (cycles per minute)
PC4200i, PC4200h	115 V 60 Hz	60
	230 V 50 Hz	60
	230 V 60 Hz	72

9.3.6 Energy conservation and regulatory compliance

Insulation Type: 2

Pollution Degree: 2 (for use in USA and Canada only)

This product is compliant with IEC 61010-1 and applicable provisions.

The CE symbol indicates compliance with 93/42/EEC.

9.3.6.1 WEEE compliance

The WEEE (waste electrical and electronic equipment) symbol indicates compliance with European Union Directive WEEE 2002/96/EC and applicable provisions. The directive sets requirements for the labeling and disposal of certain products in affected countries.

WEEE symbol

When disposing of this product in countries affected by this directive, ensure the following:

- ► Do not dispose of this product as unsorted municipal waste.
- ► Collect this product separately.
- ► Use the collection and return systems available to you.

For more information on the return, recovery, or recycling of this product, contact your local distributor.

9.3.7 Supplies

Refrigerant: non-CFC, R134A

Rel.i™ Product Warranty

USA and Canada

For technical service needs, please contact Helmer at 800-743-5637 or www.helmerinc.com. Be sure to have the model and serial number available.

Rapid resolution

When a warranty issue arises it is our desire to respond quickly and appropriately. The service department at Helmer is there for you. Helmer will oversee the handling of your warranty service from start to finish. Therefore, Helmer must give advance authorization for all service calls and/or parts needs relating to a warranty issue. Any repeat service calls must also be authorized as well. This allows for proper diagnosis and action. Helmer will not be responsible for charges incurred for service calls made by third parties prior to authorization from Helmer. Helmer retains the right to replace any product in lieu of servicing it in the field.

Compressor

For the warranty period listed below, Helmer will supply the refrigeration compressor, if it is determined to be defective, at no charge, including freight. Helmer will not be liable for installation, refrigerant, or miscellaneous charges required to install the compressor beyond the first year of the warranty period.

- i.Series model compressor warranty period is five (5) years.
- Horizon Series model compressor warranty period is three (3) years.

Parts

For a period of two (2) years, Helmer will supply at no charge, including freight, any part that fails due to defects in material or workmanship under normal use, with the exception of expendable items. Expendable items include glass, batteries, and door gaskets. Inspection of defective parts by Helmer will be final in determining warranty status. Warranty procedures must be followed in all events.

Labor

Floor models

For a period of one (1) year, Helmer will cover repair labor costs (including travel) and the cost of refrigerant and supplies necessary to perform authorized repairs. Repair service must be performed by an authorized Helmer service agency following the authorization process detailed above. Alternatively, your facility's staff may work with a Helmer technician to make repairs. Labor costs for repairs made by unauthorized service personnel, or without the assistance of a Helmer technician, will be the responsibility of the end user.

Countertop models

For a period of one (1) year, Helmer will cover repair labor costs, provided that the product is returned to Helmer for warranty service. Alternatively, your facility's staff may work with a Helmer technician to make repairs on site. Labor costs for repairs performed at a location other than Helmer, or for repairs made without the assistance of a Helmer technician, will be the responsibility of the end user.

Additional warranty information

The time periods set forth above begin two weeks after the original date of shipment from Helmer. Warranty procedures set forth above must be followed in all events.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY.

THE LIABILITY, IF ANY, OF HELMER FOR DIRECT DAMAGES WHETHER ARISING FROM A BREACH OF ANY SALES AGREEMENT, BREACH OF WARRANTY, NEGLIGENCE, OR INDEMNITY, STRICT LIABILITY OR OTHER TORT, OR OTHERWISE WITH RESPECT TO THE GOODS OR ANY SERVICES IS LIMITED TO AN AMOUNT NOT TO EXCEED THE PRICE OF THE PARTICULAR GOODS OR SERVICES GIVING RISE TO THE LIABILITY. IN NO EVENT SHALL HELMER BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION DAMAGES RELATED TO LOST REVENUES OR PROFITS, OR LOSS OF PRODUCTS.

This warranty does not cover damages caused in transit, during installation by accident, misuse, fire, flood, or acts of God. Further, this warranty will not be valid if Helmer determines that the failure was caused by a lack of performing recommended equipment maintenance (per Helmer manual) or by using the product in a manner other than for its intended use. Installation and calibration are not covered under this warranty agreement.

Outside of USA and Canada

Consult your local distributor for warranty information.

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